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THE
VICTORIAN NATURALIST:

THE JOURNAL & MAGAZINE

OF THE

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Field Naturalists' Club of Victoria.

VOL. XXXVII.

MAY, 1920, TO APRIL, 1921.

Hon. Editor: MR. F. G. A. BARNARD.

The Author of each Article is responsible for the facts and opinions recorded.

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THE VICTORIAN NATURALIST.

VOL. XXXVII.

MAY, 1920, to APRIL, 1921.

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ERRATA.

Page 39—Title of plate should read “Sir Ronald Craufurd Munro Ferguson.”

On page 125, line 6—For “Cupidiglanis” read “Cupidoglanis.”

The Victorian Naturalist.

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MAY 6, 1920.

No. 437.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th April, 1920.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about sixty members and visitors were present.

CORRESPONDENCE.

From Colonel J. M. Semmens, Chief Inspector of Fisheries and Game, acknowledging a request from the Club that the bonus offered by the Department for the destruction of foxes on Phillip Island should be increased, and stating that the request could not be complied with. He pointed out difficulties which would arise if the request were granted, and stated that he had arranged for a fox drive to take place about the middle of April, which, he trusted, would be well supported by the local residents. The departmental inspectors reported that there was no appreciable diminution in the numbers of Mutton-birds visiting the island.

Mr. J. Gabriel did not think the proposed drive would achieve what it was expected to do.

Mr. C. J. Gabriel was of opinion that the foxes have lessened the number of Mutton-birds.

On the motion of Messrs. H. B. Williamson and C. Daley, it was resolved that consideration of the letter be held over until next meeting, with the view of getting further information on the questions raised.

From Colonel J. M. Semmens, Chief Inspector of Fisheries and Game, asking the Club's opinion as to the desirableness of ceasing to issue permits for the collection of the eggs of protected birds for scientific purposes.

Mr. C. French, jun., spoke strongly against issuing further permits, giving particulars of certain instances of the export of specimens which had come under his notice, and moved—"That protected birds and their eggs be allowed to be exported only through the National Museum." This was seconded by Mr. C. L. Barrett, C.M.Z.S., who also spoke of the danger to our native birds under the present system.

Messrs. D. Best and J. Searle supported the motion.

Mr. G. A. Kearnland said that much destruction was caused among the smaller insectivorous birds by the actions of persons who, in setting snares by means of bird-lime for goldfinches, caught many other kinds of birds, which were allowed to perish. This practice was particularly rampant in localities adjacent to the Whittlesea railway line.

On further discussion Messrs. French and Barrett altered their motion, postponing the matter until next meeting, which was carried.

REPORTS.

A report of the visit to the Botanical Gardens on Saturday, 13th March, was given by Mr. F. Pitcher, who said that there was a large attendance of members, who were greatly indebted to the director, Mr. J. Cronin, F.R.H.S., for a very interesting afternoon. The time was devoted principally to the horticultural side of botany, Mr. Cronin pointing out how garden flowers were propagated and improved, illustrating his remarks from a large collection of seedling dahlias, many of which were of distinctive character. During an inspection of the propagating sheds and houses and the stove-house many other points were brought under the notice of the visitors, who evinced great interest in Mr. Cronin's remarks.

A report of the Easter excursion to Rosebud, near Dromana, 2nd to 6th April, was given by the leaders, Messrs. C. Daley, B.A., and J. Gabriel. The former dealt with the general results of the excursion, which, though interesting and very enjoyable, did not add much to the generally known natural history of the district. Mr. J. Gabriel made some remarks about the polyzoa noted, of which a good collection had been made in a couple of hours on the ocean beach at Cape Schanck.

A report of the excursion to "Ripponlea," on Saturday, 10th April, was given by Mr. F. Pitcher, who reported a large attendance of members. Owing to the kindness of Mr. B. Nathan's representatives, the members had been able to spend the whole afternoon at "Ripponlea," where Mr. Orchard, the head gardener, kindly took charge of the party, and, after a general ramble through the grounds, the orchid houses were visited, where a number of these remarkable plants were seen in bloom. The visit concluded with an inspection of the large conservatory, one of the finest in Australia, which contains large numbers of rare and handsome plants of a great variety of genera.

GENERAL BUSINESS.

The president drew attention to the great loss the Club had sustained by the deaths, since the last meeting, of Mr. G. Sweet, F.G.S., and Mr. W. T. C. Kelly. The former had been a member for a long period, and in earlier years had taken some part in the work of the Club as leader of excursions, &c. Mr. Kelly was a recent member, but he had evinced considerable interest in the Club, and in October last had invited the members to his country house at Evelyn to see his garden of scent-producing plants.

On the motion of Messrs. F. Pitcher and J. Gabriel, the hon.

secretary was directed to convey the deep sympathy of the Club to the sorrowing relatives.

The chairman said that, owing to the printers' strike, the April *Naturalist* could not be published, and at present it was impossible to say when publication would be resumed.

The chairman announced that Professor W. E. Agar, M.A., D.Sc., the recently-appointed Professor of Biology at the University, would deliver his inaugural lecture in the biology theatre on Wednesday, 21st April. Tickets of admission could be obtained on application to him.

The chairman said that he thought a limit should be put on the length of excursion reports, and that he intended to bring the question before the committee at its next meeting.

The chairman asked Professor Ewart, as chairman of the Plant Names Committee, if anything definite had been done as to the publication of the list of vernacular names of Victorian plants, for which a sum of money was in hand from the last exhibition of wild-flowers.

Professor Ewart said that, owing to various reasons, no scheme had yet been adopted, but he anticipated being able to report on a definite plan at an early date.

REMARKS ON EXHIBITS.

Mr. F. Pitcher called attention to a series of twenty-five framed water-colour drawings of Australian flowers by Miss A. Fuller. The commission to execute these—which were intended, by an anonymous donor, for presentation to the Children's Hospital—had resulted from an appreciation of Miss Fuller's work as seen at the last exhibition of wild-flowers.

Mr. C. J. Gabriel called attention to his exhibit of the method of depositing its eggs by the common *Natica*, which he had secured recently at Portland.

PAPERS.

1. By Mr. J. C. Goudie, entitled "Notes on the Coleoptera of North-Western Victoria," part viii.

The author dealt with about fifty species of the Buprestid family, including some of the largest and rarest of Victorian species. He mentioned that one of the largest species, *Themognatha (Stigmodera) heros*, Gehin., is frequently attacked by a large "robber fly," *Phellus glaucus*, which, catching the beetles on the wing, drives its dagger-like proboscis deep into the soft integument between the prothorax and the elytra, then, carrying the beetle to some convenient place, sucks its victim dry.

By the kindness of Mr. J. A. Kershaw, F.E.S., Curator of the National Museum, a case of Victorian Buprestidae was on exhibition, containing most of the species enumerated by Mr. Goudie, as well as a specimen of the "robber fly" mentioned.

2. An exhibition of lantern slides dealing with geological features near Melbourne, &c., was made by Messrs. C. A. Lambert and F. Chapman, A.L.S. The former exhibited slides illustrating the recent Club excursion to the "Organ Pipes," near Sydenham, which included also the kaolin quarries near Bulla and a view of the deep valley of the Maribyrnong River. A view of the Giants' Causeway (Ireland) was included as a contrast to the basaltic columns at Sydenham, the latter being very much higher but not so extensive.

Mr. F. Chapman exhibited slides of geological features at Surrey Hills and Mont Albert, also of the Lilydale limestone quarry, in illustration of the excursion arranged for the following Saturday.

Owing to the lateness of the hour, Mr. H. B. Williamson's slides descriptive of the Mallacoota country were held over.

EXHIBITS.

By Mr. F. G. A. Barnard. — Solvsbergite, from Brock's Monument, a hill near Romsey, about 3,000 feet above sea-level—a rare form of volcanic rock in Victoria.

By Mr. F. Chapman, A.L.S. — Examples of Lilydale fossils likely to be met with during excursion on 17th inst.

By Mr. F. Cudmore. — Teeth of extinct sharks—*Carcharodon megalodon*, from England, America, and Gippsland, Victoria; *C. auriculatus*, from Gippsland and Crassatella Bed, Table Cape, Tasmania.

By Mr. C. Daley, F.L.S. — Specimens showing the disintegration of hard, dense basalt into soft white clay, owing to atmospheric and chemical action, from Cape Schanck; also gypsum, from same locality, obtained during Easter excursion.

By Mr. J. Gabriel. — Marine algae from Rosebud and Bryozoa from Cape Schanck, obtained during the Easter excursion.

By Mr. C. J. Gabriel. — Marine shells from Portland, Vic., including *Turbo gruneri*, Phil., and *Tellina albuicella*, Lam.

By Mr. J. A. Kershaw, F.E.S., on behalf of National Museum.

— Case of about 60 species of Victorian Buprestid beetles, including most of the species enumerated in Mr. J. C. Goudie's paper on the Coleoptera of North-West Victoria, read at same meeting; also a large Robber-fly, *Phyllus glaucus*, from North-West Victoria.

By Mr. C. Oke. — Fireflies, beetles belonging to the family Lampyridæ, which emit bright bluish light from the abdomen, from Eastern United States; photographs of trees encased in ice, taken in Washington Park, Albany, U.S.A. In this case the rain froze as soon as it touched the object, and, getting into holes, expanded as it froze and burst the trunks.

After the usual conversazione the meeting terminated.

WILD LIFE IN TASMANIA.

BY G. WEINDORFER AND G. FRANCIS.

(Communicated by Dr. C. S. SUTTON.)

*(Read before the Field Naturalists' Club of Victoria, 8th Dec., 1919.)**(Continued from page 168, vol. xxxvi.)*

When driven beyond endurance, the kangaroo will double and "plant" itself—a procedure which often gives it enough breathing time to resume its flight; or, should a water-course or lake be handy, no matter how exhausted, it will take to the water. Its anatomy, and to some extent its timid nature, is against its being a good swimmer, the strokes being executed with both feet simultaneously, in the same manner as it advances on the ground, without the aid of its arms. For the first few minutes its movements in deep water are rapid, the body being, with every stroke, thrown forward and half out of the water, but soon, with slower and less vigorous strokes, the neck, which in its rapid movements was kept above water, begins to disappear, the head gradually becomes submerged until little more than the nose is exposed, and the fore-arms come frantically into action, churning the water and filling the nostrils of the unfortunate animal with spray. Finally, after a few more desperate efforts with arms and legs, the movements cease, and only the ripple of the disturbed water mark the scene of the fatal struggle. If one takes into consideration the low temperature of these alpine lakes, it is no wonder that a harassed and overheated animal, once in the water, has little chance of escape.

The kangaroo, unlike its bigger congener of the continent, will never fight the dog, either on land or in water. Once thrown, its main attempt is to regain its upright position, and only in rare instances will it punish a foolish dog with its hind legs. Regaining during a *mêlée* its upright position, it will often jump backwards, and before the dogs have realized its tactics will sometimes make good its escape. During and after heavy snowfalls, when the ground is covered with a depth of snow from two feet upwards, the kangaroo will make no attempt to move from its hiding-place until such time as the snow hardens.

When suddenly surprised by the glare of an acetylene lamp, a kangaroo may occasionally be momentarily hypnotized, but in most cases the animal will at once make off, but so terrified is it by its own huge shadows that it tries to escape in all directions, once even madly charging towards the observer, who, falling into a fit of laughter, accidentally turned the light from the animal, and gave it a chance to escape, which it at once availed itself of.

In order to reach its feeding-grounds on the grassy plains, where the white grass, *Poa caespitosa*, predominates, the kangaroo follows certain tracks winding through the scrub, which have been formed through years of usage. It is at the exit of these tracks from the scrub, or somewhat in the scrub itself, that the trapper sets his snares. For kangaroos that most frequently used is the "wire necker," made of brass wire, fixed to any convenient firm object, and kept upright by means of a stick which is split at the top to receive the wire. Other forms of snares are the springers, of various kinds, but all for the purpose of catching any animal by the feet. A third form, called the "necker springer," is a combination of the two, whereby the necker is connected with a springer, and thus causes strangulation. This last form is rarely in use, because it entails more labour to set up, and is, besides, dangerous to dogs.

It is the "wire necker" which reveals a distinct difference in intelligence between *Macropus ruficollis*, var. *bennetti*, the Bennett's Wallaby of the scientist, and *Macropus billardieri*, the Rufous-bellied Wallaby. Whereas the latter is capable of using its senses in times of danger, and often successfully extricating itself from a snare, the former exhibits its mental inferiority by almost invariably falling a victim. Reference has been made to the tracks which kangaroos and wallabies alike use when moving from one place to another. In doing so, the animal's body is not only bent forward, but its front quarters are actually carried somewhat lower than its rump. Should a kangaroo happen to place its head and neck into the fatal loop of the wire necker, its life must end there and then, for as soon as the wire, by the forward movement of the animal, begins to tighten, there is a mad leap for liberty by the doomed animal, which lands it, in most cases, full length on the ground with a broken neck, or, if this does not happen, it will choke itself in its frantic endeavour to escape. How different under such circumstances does the far smaller wallaby behave! There is no mad rush to escape in its case, but with almost human-like intelligence it tries to remove the inconvenient encumbrance with its front paws, leaving sometimes a little tuft of fur attached to the wire. With such marked differences in their behaviour, one cannot help drawing a distinct line between the two congeners and retaining for the mentally less favoured species the name of "kangaroo."

The breeding season of the kangaroo begins in October or November, when occasionally mating pairs may be noticed moving about in the low scrub clothing the higher altitudes. Not before March or April can the young be found in the pouch, which, in extremely rare cases, may contain two. In this

connection reference may be made here to two similar cases observed during the summer months of different years, but, unfortunately, no record of the exact dates was made. One of us, while wandering through low scrub at a high altitude, noticed, on a somewhat open space exposed to sunlight, that the grass within a space of about a yard was stained with patches of blood. The vegetation was much trampled on, and other signs pointed to the fact that a kangaroo must have been camped there for some time, in all probability being just disturbed by our approach, and having only just left the place. Among the blood were some pieces of membrane—perhaps decidua—but a close scrutiny failed to find anything more. It was evident the blood did not come from an animal accidentally wounded by gunshot or the worrying by dogs, for there was no fur left on the ground. The likelihood was that both cases had something to do with the transfer of the young to the mother's pouch.

Like the wombat, the kangaroo is infested with a worm, which shares the food with its host in the stomach and intestines, and is to be found more or less in every specimen, but does not seem to affect the condition of the animal. Of a more discomfoting nature must be the parasite (especially numerous in summer) inhabiting its fur, as well as that of the wallaby. This is about 2 to 3 mm. in length, light-brownish in colour, and known as the "kangaroo louse." It has the decidedly unpleasant habit of immediately transferring itself from the freshly-killed animal to the head of the person who carries the carcass, where its aimless wandering sorely tries his endurance.

The quality of kangaroo meat, and in particular of its tail, as also the value of its skin, need no comment. It is the latter, however, which leads to its undoing. The prices paid for skins at Launceston auction sales vary according to circumstances, and range from 1s. 6d. per lb. (at the outbreak of the war) up to 7s. 6d. per lb. one or two years prior to 1914.

RUFIOUS-BELLIED WALLABY, *MACROPUS BILLARDIERI*, DES.

Country people divide the wallaby into two varieties—the Rock and the Swamp Wallaby—according to the locality in which it is found, and it is very likely that this is the only difference between them. Since the Middlesex and Cradle Mountain districts are both rocky and swampy, and the animal is invariably found in wet places, there can only be the Swamp variety in the district. True, the wallaby of the lowlands seems to be somewhat bigger, but this may be the result of more favourable climatic conditions.

A comparison between the kangaroo's and the wallaby's

behaviour when trapped has been already referred to, and it only remains to be said that in every way the wallaby is far the cleverer animal. When hunted with dogs it is, for at least a short distance, considerably faster than the kangaroo, and is an expert in doubling and otherwise dodging its enemies. It frequents the thickest scrub, and will rarely leave it unless at night time to feed on the plains, or to change its feeding grounds altogether. This it usually does when the trappers make their appearance. It is not unusual to follow a wallaby's track in the mud leading to a springer snare, where the animal appears to have paused to consider the advisability of going on or of taking another direction, and evidently had decided for the latter course.

It is an extremely quarrelsome animal, as is evidenced by the frequently scarred condition of its skin, and its pugnacity spoils the pelt from the trapper's and skin dealer's point of view. It is, of course, weaker than the average hunting dog, but nevertheless puts up a good fight, using both hind and front feet, and accompanying its efforts with an angry growling.

(To be continued.)

THE LATE MR. W. T. C. KELLY.—By the death, on 26th March, of Mr. W. T. C. Kelly, the Field Naturalists' Club lost a comparatively recent addition to its members' roll, but one who promised to be an enthusiast. Mr. Kelly, though a practising barrister, had latterly given considerable attention to the growing of scent-producing plants, and, in addition to a lavender plot at Mentone, had another garden at Evelyn, where, in October last, he had interested and entertained a party of members of the Club with the details of his hobby.

SIR BALDWIN SPENCER, K.C.M.G. — A large and representative gathering met in the biology theatre at the Melbourne University on Friday afternoon, 26th March, in order to say farewell to Sir Baldwin Spencer as a Professor of the University. The Chancellor, Sir John Macfarland, occupied the chair. Dr. Georgina Sweet, D.Sc., read an appreciative address, which was signed by all present, in which it was stated that with the fund raised to commemorate Prof. Spencer's thirty-two years' work at the University two prizes had been founded—one for first year zoology and the other for first year biology. Dean Hart, a one-time member of the F.N.C., and Prof. Agar, the new professor, also spoke. Sir Baldwin Spencer feelingly replied, and expressed his gratitude for the loyal assistance he had received from all who had been associated with him.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 10th May, 1920.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about 100 members and visitors were present.

The president reminded members that the meeting was the fortieth anniversary of the Club, and expressed his pleasure at seeing among those present Messrs. C. French, sen., D. Best, W. M. Bale, F.R.M.S., F. G. A. Barnard, J. E. Dixon, F. Pitcher, and F. Wisewould—seven out of the eight "original" members of the Club at present on the roll, the eighth, Mr. T. G. Sloane, being a resident of Central New South Wales.

CORRESPONDENCE.

The letter from the Fisheries and Game Department with reference to the issue of permits to collect eggs of protected birds, read and discussed at the previous meeting, and postponed for further consideration, was brought forward, and, on the motion of Messrs. Pescott and Barrett, it was resolved to inform the Department that the Club is opposed to the issue of any permits.

Another letter from the same Department, which had also been discussed at the previous meeting, on the subject of the destruction of Mutton-birds at Phillip Island by foxes, was considered. It was reported that the recent "drive" had been successful, and a motion was carried asking the Department to continue this method of lessening the number of foxes.

ELECTION OF MEMBERS.

On a ballot being taken, Miss F. Power, Eye and Ear Hospital, Melbourne, and Prof. W. E. Agar, M.A., D.Sc., Melbourne University, were duly elected ordinary members, and Miss K. Drummond, Nhill, as a country member of the Club.

GENERAL BUSINESS.

Messrs. F. Keep and F. Wisewould were elected to audit the accounts for the year 1919-20.

Nominations were made for office-bearers for year 1920-21.

Mr. H. B. Williamson gave notice that at the next monthly meeting he would move the following motions:—(1) That this meeting considers that the Club meetings can be made more attractive by more frequent use of the lantern, and that members be encouraged to make and exhibit slides showing Victorian physiography and natural history; (2) that in view of the objection that the ordinary business of the Club and the reading of papers require all the time at the monthly meetings,

the committee consider the advisability of arranging special lantern meetings on some of the fourth Mondays of the month; (3) that the incoming committee consider the necessity of purchasing a lantern; (4) that at the next meeting names of members be handed in who practise photography, and who desire to meet together to interchange ideas with the view of making slides to illustrate the natural history and physiographic geology of Victoria.

PRESENTATION.

The president called upon Mr. George Coghill to receive a presentation from the members in recognition of his fifteen years' service as hon. treasurer (1904-19). This took the form of a copy of "*Australia Unlimited*," by E. J. Brady, bearing a suitable inscription.

Mr. Coghill said that the presentation came to him as a complete surprise. He greatly appreciated the goodwill of his fellow-members, and would value their recognition of his efforts on behalf of the Club. His work as hon. treasurer had taken up a considerable amount of time, but it had been a labour of love.

PHOTOGRAPH.

Opportunity was then taken to secure a flashlight photograph of the gathering, which was very successful.

WELCOME.

The president formally and heartily welcomed the original members, new members, and visitors, congratulating them and the Club on its having attained its fortieth birthday. Apologies were announced from Sir Baldwin Spencer, K.C.M.G., Mr. C. A. Topp, I.S.O. (both former presidents of the Club), Dr. Freda Bage (Brisbane), Dr. C. S. Sutton, and Mr. C. French, jun. Of the thirty-four members on the roll of upwards of twenty years' standing, other than "original" members, there were present:—Messrs. J. Stickland (1880), F. Spry (1882), G. Coghill (1882), J. Gabriel (1883), Mrs. Bage (1884), J. Searle (1885), J. A. Kershaw (1888), J. Shephard (1889), J. Wilcox (1898), C. L. Barrett (1899), and C. J. Gabriel (1890).

Congratulations were also heartily extended to Mr. F. Chapman, A.L.S., on the honour which had come to him by the award of the Syme prize of £100 for original research to him in recognition of his long-continued and valuable work in paleontology. Mr. Chapman, he mentioned, had also been appointed lecturer in paleontology at the Melbourne University.

Mr. Chapman briefly responded.

PAPER READ.

By Mr. F. G. A. Barnard, entitled "*The Field Naturalists' Club of Victoria, 1905-20: a Retrospect.*"

The author, in continuation of a presidential address to the Club in June, 1906, in which he detailed the first twenty-five years of the Club's history, gave an interesting *résumé* of the last fifteen years of its activities, thus completing the forty years of its existence. He gave the results in figures, as follows:—Papers read, 916; 36 volumes of the *Naturalist* issued, containing 8,456 pages, at a cost of £3,195. The total receipts from subscriptions, &c., had been about £5,675, and the expenditure, including *Naturalist*, about £5,577—leaving a balance of nearly £90, including a £20 war bond. He considered the Club had justified its existence, and the members had a record of which they might well be proud.

Complimentary and congratulatory remarks on the work of the Club were made by Mrs. E. Bage, Prof. A. J. Ewart, Messrs. F. Wisewould, C. French, sen., W. M. Bale, D. Best, F. Pitcher, D. Le Souëf, J. L. Robertson, J. Gabriel, the president, and others.

EXHIBITS.

By Mr. R. W. Armitage, M.Sc.—A large example of dendrite on granite, about two square feet, from Beechworth.

By Mr. C. E. Cole.—Australian moths, mostly Tasmanian specimens.

By Mr. F. Cudmore.—A large reef-building fossil coral, probably *Spongiphyllum*, sp., from the Upper Silurian of Hatton's Corner, near Yass, N.S.W.

By Mr. C. Daley, F.L.S.—Garnets from North Queensland.

By Miss A. Fuller.—Beetles from southern Western Australia, including *Stigmodera testacea*, *S. heros*, *S. murrayi*, *S. marginala*, and *S. cherrorlata*.

By Mr. C. J. Gabriel.—“Pagoda” shells from Japan, including *Latiaxis mawæ*, Gray, *L. japonicus*, Dunk., *L. lischkeana*, Dunk., *L. deburghia*, Reeve, and *L. spinosus*, Hirase.

By Mr. E. E. Pescott, F.L.S.—A leaf of *Opuntia monacantha*, growing after having been cut from plant more than twelve months, also a fruit sending out roots, and a leaf shoot: fossiliferous limestone from Maria Island, Tasmania.

By Mr. A. L. Scott.—Dendrites from Cave Hill quarry, Lilydale; also, for comparison, a plate showing the dendritic and crystallitic appearance assumed by bichromate of potash in gelatine.

CONVERSAZIONE.

After an inspection of the exhibits the company adjourned to the lower hall, where supper was laid, and a most enjoyable half-hour was spent. Cheers were given for Mrs. E. Bage, the only life member of the Club, and the principal promoter of the reunion, who had recently returned from a lengthened visit to England.

WILD LIFE IN TASMANIA.

BY G. WEINDORFER AND G. FRANCIS.

(Communicated by Dr. C. S. SUTTON.)

*(Read before the Field Naturalists' Club of Victoria, 8th Dec., 1919.)**(Continued from page 8.)*

Like its congener, the Rufous-bellied Wallaby breeds only once a year, and at about the same season, and its young make excellent pets until the wild ultimately calls them. At first they will stay away a night, coming back again in the morning, and again will absent themselves for one or two nights, or even a week, until at last they will be seen no more.

That it is an excellent swimmer is beyond doubt. On one occasion, when harassed by dogs, a wallaby took to a rushing torrent, and in attempting to cross was sucked under a log and disappeared from view, but soon reappeared, and after a short struggle safely landed on the opposite bank, leaving the pair of dogs howling with disappointment.

About the year 1890 a disease broke out amongst the wallabies at Middlesex, which killed the animals in such numbers that it was thought they had been quite exterminated. All over the bush their dead bodies could be found, without any apparent traces of the disease. However, later on they slowly increased again in numbers, and eventually became more numerous than before.

The meat of the wallaby is not unlike that of kangaroo, though the bush connoisseur will declare that its flavour is somewhat stronger. Like the kangaroo, it offers shelter to the same vermin, but in a lesser degree. Its hides command practically the same prices as those of kangaroos.

TASMANIAN RING-TAIL PHALANGER, OR POSSUM, COMMONLY KNOWN AS "RING-TAIL," *PSEUDOCHIRUS COOKI*, DES.

Amongst the bush animals the Ring-tail holds the distinction of being the most respectable, for, from appearances, it marries for life. Whereas there are no indications amongst all the other mammals dealt with in this paper that the male shares with his chosen mate the care of their offspring, the Ring-tail pair will, from the moment that they have mated, together build their house and rear their young, which on rare occasions may number as many as three in the pouch.

The male, unlike so many other animals of the bush, is a peaceful animal, showing no pugnacity even during the pairing season, in late spring. In numbers the males appear to predominate, for one hardly ever finds a solitary Ring-tail female, unless, perhaps, its mate has fallen a victim to the hunter, to disease, or other circumstances. Such males as fail to secure

mates seem to take their lot philosophically, without disputing possession with those more fortunate, and live their lives in single blessedness until the fates choose to provide them with partners.

The Ring-tail has, as enemies, the Native and the Tiger Cat, from which it may escape by taking to a tree, where, in turn, it may be attacked by birds of the Owl family. So used is the Ring-tail to these enemies that it does not seem to comprehend any other danger, and therefore falls an easy victim to the gun. It does not fear men, and during its nightly rambles will climb over tents and huts, and, prompted perhaps by curiosity, will even enter them. It is essentially an animal of the night, but occasionally may be found in daytime sleeping against the butt of a tree.

Its nest is usually in some hollow in a tree, and is comfortably bedded with leaves and bark of gum-trees torn to small pieces. Occasionally it will build, high up in a tree in the depth of the beech forest, an equally comfortable and commodious nest of twigs, with an opening on one side, and will line it snugly in the before-mentioned manner. The rigours of the severe winters in these high altitudes incline it, however, to prefer the more substantial shelter within the hollow of a gum-tree. The time for nest-building seems to fall in two periods. The first is after the pairing season; the second, for which, however, no definite proof can be offered, occurs after the weaning of the young, which, according to climatic conditions, may occur between the months of May and September, early snowfalls and bad weather conditions retarding this event. About this time the young Ring-tails are found alone in the nest, their parents having apparently left it to them and in all probability sought a dwelling in another locality. The young do not venture out into the open gum forest until accustomed to the new order of things. About this time one may find embryos in the mother's pouch, which will always contain two.

Amongst many people the belief is prevalent that the Ring-tail is a tree-dweller that seldom ventures on the ground; but as a matter of fact most of its time during its absence from the nest is spent on the ground, unless the night be stormy. If its dwelling is surrounded by dense scrub, the animal will move along the branches and tops of trees until open country is reached, and descend in order to feed on grass and other herbage. Having satisfied its appetite, it will, from about 10 o'clock until midnight, sit quietly on a tree. After this time there will be a general gambolling in the trees and on the ground, with further feeding on young gum-leaves and other juicy herbs, preferably those that have sprung up after a bush fire the year before, and the early call of the Mountain Black

Jay will find it home again. That the Ring-tail will travel considerable distances on the ground is evidenced when the snow is lying. Then one can follow the spoor of male and female side by side over a distance of many chains. When undisturbed, its way of walking may be compared with that of a domestic cat, but when hurried it reaches the nearest tree in the shortest possible time by a series of short jumps on all fours. In this fashion having gained the first limb, it will usually utter a whistling cry as a warning to its family, and will be invariably answered in a similar way.

The Ring-tail is very sensitive to cold, and in frosty weather or on stormy nights will prefer the warm shelter of the scrub. The glare of the acetylene lamp seems to fascinate these little beasts—unless a dog is in the vicinity, when their eyes will follow every movement of the latter.

The old way of hunting the Ring-tail is the gun aided by a bright moon, but the use of the acetylene lamp has superseded this method, and the comparatively easy way in which the animal falls a victim to the hunter will sooner or later seal the fate of its kind. When slightly wounded by a gunshot it will try to make good its escape over branches of neighbouring trees, or, if space is available, will climb higher. Severely wounded, it will slowly walk down the tree head first. A popular belief is that the Ring-tail will attach itself by the end of its tail to a convenient branch, and, after swinging itself, will, by a sudden relaxing of its grip, move through the air to a lower branch. A movement of this kind has never been noticed by us, though its tail will frequently come into use, so to speak, as a fifth limb for the purpose of holding on or as a means of keeping its equilibrium. The fact is well known that a Ring-tail, when falling from a tree, has in many cases caught on a branch and remained hanging by the tip of its tail, and has even continued in that position until nothing but its skeleton has remained. As a rule it is not aggressive, and will rarely defend itself, though cases are known where the careless handling of a wounded animal has resulted in a bite.

Another way of hunting is the steel trap, placed upon a short piece of wood leaning against a tree which on its bark reveals a Ring-tail run, or the wire snare fixed upon a pole placed at an angle of 45 degrees against the tree. But the latter method is unprofitable for the professional hunter, because, unlike the Brush Possum, the Ring-tail will often find it possible to sever the wire with its teeth and make good its escape. The lower end of a run on a tree will disclose whether it belongs to a Ring-tail or a Brush Opossum. Whereas the former, when undisturbed, begins its climb from the very bottom of the tree, the latter will invariably do it with a jump from the ground,

and thus its run will begin a few feet up. Besides, the possum being the far larger animal of the two, its run will appear correspondingly wider.

Like most animals, the Ring-tail is a good swimmer, though it has not been known to take to the water deliberately. It is free of vermin, unless perhaps of microscopic size, but is invariably infected with a long and yellow tape-worm, which, however, does not seem to affect its general condition. A disease giving no outward signs of its presence, in a varying degree constantly takes toll among its numbers, as is evidenced by frequent finds of dead animals in the bush. Occasionally so virulent is the disease that very few are left alive. Such a visitation occurred at Middlesex about the year 1912, but did not extend to the higher elevations of the Cradle Mountain. Frequently the fur on the rump, extending even somewhat down along the butt end of the tail, has a worn appearance, and to this the trade has applied the name "joey-ridden," attributing the defect to the fact that in climbing the tree the young cling to their parents' back and so cause eventually the disfigurement. Since conditions of this kind may be noticed on individuals at any time of the year, it may be safely presumed that the young have nothing to do with the matter, and that the occurrence must be attributed to some other cause. In any case, in this district it is of rare occurrence.

The Ring-tail has a penetrating odour, which may be likened to a mixture of eucalyptus and stale fat, and this is sometimes so strong that on a quiet, windless night, on walking under a tree, one may suspect in it the presence of the little animal. Its flesh, however, when cooked in form of a stew, has none of this odour, and bears favourable comparison with chicken.

Ring-tails are tamed as easily as wombats, but, unlike this animal, prefer unrestricted freedom. Its fur has until lately been regarded only as a second-class article, but lately has come more and more into favour. Some years ago the price paid to the hunter did not exceed 6s. per dozen, whereas at the present they may realize up to 35s.

TRICHOSURUS VULPECULA, VAR. FULIGINOSUS, OGILBY.

Tasmanian Phalanger or Brush Possum, commonly known to the trade under the name of "Brush." Clive E. Lord, in his "Notes on the Mammals of Tasmania," 1918, page 39, in describing the species, says:—"It is sometimes questioned if we have not two species, but I prefer to treat them as one. In this connection see notes by Ronald Gunn, page 84, *P. and P. Royal Soc. Tas.*, 1852."

In the Middlesex and Cradle Mountain district there exists only one species, but the fur varies from light grey to dark

from dull black to shining umber-brown, from light rufous to the deepest black, these differences often being noticed occurring between the mother and its young even when the latter is in the pouch fixed to the teat.

The Brush Possums, unlike the Ring-tails, rarely appear in pairs. It is a roamer in the widest sense, and one may follow its footprints in the snow for miles. It has no definite home, resting in a tree or any other convenient place that offers shelter, and it may be found in daytime sleeping against a rock or tree, sometimes singly, or several together. As far as we know it never builds itself a nest.

It is the most inquisitive of animals. Everything unusual must be inspected by it, and should it come along a game track, where a wire snare is waiting for an unsuspecting kangaroo, the Brush must raise its body and investigate the strange contrivance, wherefrom it frequently omits to withdraw its head before moving on, with the result that its body comes to occupy the position intended for the larger animal. If a stick is firmly fixed in the ground on a game run, the next day you may possibly find that this has been used during the night as a maypole by the Brush. It is a frequent visitor to camps, and among the vegetables will refuse nothing but onions. It is inordinately fond of sweets, and an empty jam tin will often be its undoing, for in trying to reach to the bottom it will insert its head too far, and find it impossible to withdraw from the awkward situation.

It has no enemies, with the exception, perhaps, of the Wedge-tailed Eagle, to which it may fall a prey through its undomestic habits. It is no fighter, though endowed with formidable claws and a strong set of teeth. Surprised by dogs, it will always seek to escape on the ground instead of by taking to a tree, with the result that it is generally overtaken and the fur ruined. While still warm, it is almost impossible to skin a Brush without detriment to its fur, and in carrying one freshly-killed the chances are that this will be seriously damaged.

Only when suddenly confronted with the acetylene light will the Brush Possum remain quietly sitting on a limb: otherwise it will descend from the tree and take to flight on the ground, but, unlike the Ring-tail, it will refuse to be hypnotized. Only occasionally will it reveal its blood-red, flashing eyes by gazing momentarily at the lamp. If it be wounded, however, or even missed by gunshot, it will immediately realize the danger of its position, and, no matter how many dogs are waiting under the tree, will run down head first and try to escape, covering the ground in jumps not unlike those made by the domestic cat, though with less agility.

The "Brush" breeds the first year of its existence, has one young per annum, and when that is grown too big for the pouch it will follow the mother on her nightly rambles. On the approach of danger the mother takes with its young to a tree, and it is a very pretty sight to see the older animal running up the tree by big jumps with the young holding on to its back.

The Possum has a "laugh" not unlike that of a human being, which on still nights may be heard plainly over great distances. This is uttered by both sexes, and is more frequently heard during moonlight nights, and perhaps is the outcome of satisfaction and contentment.

This Possum has a penetrating, somewhat acrid odour, though not quite so unpleasant as the Ring-tail. Its flesh is considered by bushmen as superior to that of any other animal. The fur is easily one of the most valuable in Australia, and by the trade is classed in three grades—viz., Black Possum, of a deep umber brown, which at auction fetches up to 10s. each; Grey Possum, worth from 2s. 6d. to 5s.; and "off colour" (any colour between grey and black), with a value of 2s. 6d. or less. A true jet-black opossum has never yet been obtained at Middlesex, and perhaps never in Tasmania, and furs of this description, sold as rugs, &c., are undoubtedly made up of dyed skins of second and third quality. The Brush Possum can be kept in captivity, and its skin is of such value that its breeding would seem to be a very profitable proposition.

TIGER CAT, *DASYURUS MACULATUS*, KERR.

This is one of the pluckiest animals of the bush, and will fight for its life to a finish. When cornered the size of its antagonist will never deter it from defending itself with teeth and claws, and cases are known of it, on the rare occasions when it is held by a snare, boldly attacking the approaching trapper. On one occasion one of us was roused from his slumbers at early dawn by an unearthly tumult, in which one of the dogs was evidently engaged with some intruder. On stepping outside the disturbance had transferred itself to the thick pine scrub, whence suddenly the dog, looking almost twice its usual bulk, emerged. Circling rapidly round its master, it soon drew near enough to be grabbed by the neck, when a Tiger Cat was found hanging by teeth and claws to the dog's chest and abdomen.

The Tiger Cat is essentially a dweller of the dark forests and mountain gullies, and, though sometimes met with in daytime, prefers the night for its raids on smaller animal life. It is always found alone, and only on rare occasions will male and female be caught by one and the same trap. It loves to roam, and will extend its hunting expeditions over considerable

distances, but its cautious nature will always keep it within the vicinity of the sheltering scrub. It prefers to kill its own meat, and will even attack a wallaby or small kangaroo when helpless in a springer snare. Its most inveterate enemies are the trapper and the fowl-keeper, which is not to be wondered at, for it plays the mischief with fur animals when caught in a snare, and is so destructive to poultry that apparently for the mere sake of killing it will dispose of a whole fowl-yard during a few hours. Amongst the animals of the bush it has no enemies, except, perhaps, those of its own species. Considering that six young, which appear in the pouch about July, are born every year, the bush ought indeed to be alive with them; yet, strange to say, its numbers, compared with those of the Native Cat, are comparatively few.

Strictly speaking, it is not a climber, but, in its endeavour to reach its food, will overcome many obstacles, and on one occasion a Tiger Cat was shot out of a tree 50 feet above ground. Its persistence in endeavouring to gain access to a dwelling during the night is very trying to the temper of both men and dogs, and almost invariably ends in its death in one way or another.

As a rule no one intentionally traps the Tiger Cat, for its fur is practically useless from a trading point of view, though when tanned its skins make a passable rug. It happens, however, that Tiger Cats often run into the steel or box traps set for Native Cats. When caught in the former it will make every endeavour to escape, even going so far as to chew its own foot to pieces and successfully freeing itself. Caught in a box trap, if the pieces keeping the sliding door in position are not lined with tin it will certainly make good its escape in a very short time.

For culinary purposes the Tiger Cat cannot be recommended, though strong stomachs have been known to accept it when other meat was lacking, and the stomach must indeed be strong when it is stated that even the dogs refuse it.

The movements of the Tiger Cat are slower than those of an average dog, wherefore it mainly relies for escape on doubling, in which it is expert. Apparently it is free of any vermin, and to the glare of the acetylene lamp it shows only its hindquarters.

COMMON NATIVE CAT, *DASYURUS VIVERRIMUS*, SHAW.

The light brown, white-spotted variety is fairly plentiful in the district; the black and white extremely rare. Unlike the Tiger Cat, it has its home in the open gum forest, though when its young leave the pouch it retires into more inaccessible places. The hunting-grounds are the grassy plains and open stretches of button-grass, the home of the "Grass Rat." Besides this

animal it also seems to have a partiality for small birds, and follows its victims into trees, though, like its congener, it is not an expert at climbing. It is a common nuisance in and around camps, and will pay its nightly visits without regard to watch-dogs. Having had its fill, it will, as likely as not, make itself comfortable under a bunk in which one is sleeping, and after the manner of a house cat, with which it has much in common, will indulge in a contented purr.

Chased by dogs, like the Tiger Cat it will rely on the trick of doubling until it manages to find a safe haven in a hole in the ground or a hollow log. Safe in some such haven, it will turn and defy its enemies, uttering sounds not unlike those produced by the cracking of nuts in quick succession.

It has no definite home, and one may frequently find the animal out in daytime, either asleep in some cosy corner or on business bent. It has been observed that its condition is invariably poor in summer, but fat in winter, the explanation being that in all likelihood its prey is more easily caught in the severer season.

The embryos appear in the pouch about the month of July, and, as is the case with the Tiger Cat, the pouch, after the young are reared, seems to disappear. Thus, on a casual glance, the animal does not look like a marsupial. Whether it lives in pairs cannot be definitely stated, but male and female and their six young have been caught in succession by one and the same trap. From this one may venture to conclude that in all probability the young are instructed in their ways of life by their parents. The young seem to be kept in seclusion, after the manner of the Tiger Cat, for a considerable time, for, as a rule, they are never seen or caught unless far advanced in growth, and therefore must be supplied with the necessary food during their early months by one or both of their parents.

The Native Cat is a far less cautious and suspicious animal than its bigger congener, and the sudden appearance of the acetylene lamp will cause it to sit down on its haunches and irresistibly stare into the light, apparently being at the same time oblivious of the danger threatening from the direction of the dogs. Into steel and box traps they appear to walk without hesitation, and, to induce them to do this, a common practice of trappers is to drag the carcass of a kangaroo over the places where these are set. Caught in a trap, it behaves something like the Tiger Cat, but with less success. After an attempt to regain its freedom it appears to accept the inevitable, and, if the position allows of it, will even fall asleep. One, which was found to be a female, was even observed to be anxious to retain its feline attractiveness by cleaning its head and face with its paws, much after the fashion of the house cat.

Its skin, which seems to be free of vermin, is, when tanned, very attractive, and is sometimes used in the manufacture of rugs. Its wholesale price is about 6d. apiece, but, like all furs, it will sooner or later rise in value, and the animal will then receive more attention.

THE SOOTY CROW-SHRIKE OR BLACK JAY, *STREPERA FULIGINOSA*, GOULD.

No visitor to the Tasmanian highlands will fail to remember the harsh cry of the Mountain Jays, their fearless behaviour towards the intruders on their happy mountain home, and their inquisitiveness towards everything out of the common. No other living thing is so characteristic of the Tasmanian highlands as this interesting bird, which is to be seen and heard everywhere—in the open gum forests, on the wide grassy plains, near the shores of the lakes, and amongst the wind-swept rocks of the highest altitudes.

The Sooty Crow-Shrike belongs to a group which is restricted to Australia, Tasmania, and Lord Howe Island, and placed at the head of the bird world. The birds live in flocks, and commence each season with a general meeting about August or September, which the observers have termed the "pre-nesting corroboree." On this occasion different units will congregate in certain places, and, mostly keeping to the ground, will for days voice their political and social views in an endless chatter of an ear-piercing character. After different views have been voiced and settled, the mating for the breeding season takes place in a peaceful way, the mob disperses, and the individual pairs take up their respective positions. But here a communistic government still seems to be in force, as is evidenced by the presence of a leader, whose voice, distinct from the rest, may be first heard at early dawn in a soft and somewhat melodious sounding "Ghiglia - glag - glag - glag." On some mornings there will be no answer, and in a renewed and higher tone the *reveille* will sound again. From afar the first faint answer will reach the observer's ear, another one will come from a different direction, and in a very short time every bird will have announced the beginning of another day.

During the nesting season there is no overcrowding; every pair keeps strictly to a certain locality, and when the time is ripe will begin the building of its nest. This mainly consists of a few sticks and twigs, so casually stuck together on a fork of a tree that it is a wonder that later on, in stormy weather, the young birds manage to remain in it. The bedding is of the scantiest possible nature unless it happens to be a couple of handkerchiefs acquired from the bleaching-ground of one of the observers. The nest will never be built in the heart of

the scrub, but invariably near its edge, so that the young birds on their first excursions to the plains may escape the lurking danger of the cat beneath. Should an accident befall one of the pair during the nesting, and the bird disappear, its mate will, on the discovery, raise a hue and cry, which will be answered from all points of the compass, and willing mates will join in and in an agitated way scour the whole district, uttering a distinct cry, which apparently is expected to bring about an answer from the missing bird.

The weaning of the young, which falls about the end of January, is done in a curious way, and helps to illustrate the social habits of the bird. No sound is uttered as the parent birds flutter from tree to tree, their numbers increasing as each nest is passed. On they go, still no sound disclosing the direction of their flight, and in ghost-like, uncanny silence the procession continues until the last birds are lost to view. The next morning finds the young birds sitting disconsolately on trees, at first not knowing what to do in the absence of their parents. In all probability the old birds have migrated to higher elevations where a later season assures an ample supply of food in insects and berries of various *Stypheliaceous* plants.

Their return in autumn is done in a similar but less silent way, and was observed during May, 1918, when an endless train of birds came from the south, flying northwards by way of the lakes and river courses. Apparently they had come a long distance, as here and there birds were seen to alight on trees for short rests, and the cheerful sound of their voices was heard from all along the line. Although the first arrivals had not been noticed, nor yet the end of the procession seen, the interested spectator had to turn for home after enjoying the unusual sight for several hours.

The Jay will call at any hour of the night, especially when the moon is shining, and the reason must be either that it has been disturbed by the approach of some intruder or that it is expressing its feelings, like the possum with its human-like laugh.

The worst enemies of the Jay are the members of the Owl family, and in wandering through the bush at night one may not infrequently hear the agonized cry of an unfortunate victim. Anything in the way of insect food will be wholly digested by this bird, but in the case of the berries of *Drimys aromatica*, *Cyathodes accrosa*, and other plants the seeds are regurgitated.

The flesh of the old bird, when boiled down, will make a passable soup—at least it will be better and richer than one has to get accustomed to in average restaurants and boarding-houses. The young bird holds its equal with any other game-bird.

In conclusion, a word about the system of licensing the game hunter in Tasmania may not be out of place. For the paltry sum of £5 any person is permitted to hunt or destroy game on Crown lands during the open season—*i.e.*, four months for kangaroo and wallaby and two months in the case of possum. The owner of private property is free of any tax as far as his land is concerned. A man who manages to make, say, £200 during a season is thus taxed no more than the one whose luck brings him only, say, £30. It would be, therefore, infinitely fairer to all concerned, and more profitable to the Government, to place a tax upon the individual skin.

In Tasmania few persons have ever taken the slightest interest in the war of extermination now proceeding between man and the native fauna. As time goes on the demand for skins for the manufacture of leather and furs for general use is constantly increasing, and this demand must be supplied. No one will dispute that animals were made for the use of man. If they are not utilized they pass the age of maturity, fall victims to disease or die of old age: but man has, by his want of foresight, or by his greed for gain, already laid waste large areas of game country, and seriously reduced their numbers in the remaining parts. Wherever man begins to subdue the wilderness and to cultivate the soil, or to win the precious metal, there a battle royal at once ensues between him and Nature; but why, in a civilized community, the feud should be carried on with the risk of utter extermination is hard to conceive. The State possesses large areas in its interior which will never come into use for reproductive work, but could most effectually be turned into game reserves, where, undisturbed by the presence of man, the species could at least preserve themselves.

NATURE STUDY.—The Victorian branch of the Nature Photographers' Club of Australia will hold an exhibition of lantern slides, with two illustrated lecturettes, at the Athenæum (Upper) Hall on Monday evening, 21st June.

A STRANGE NESTING-PLACE.—A correspondent of the *Sydney Mail* of 2nd June sends an account of a pair of Wood-Swallows which built a nest in the latch of a double gate on Yanko station, Riverina. The gate posts were out of plumb, consequently the latch was not used, a chain round the two gateheads being substituted. The latch was left dropped back on to the top bar of the gate. This formed the receptacle for the nest. The gates were constantly used, when the sitting bird flew off the nest, and fluttered overhead until the gates were closed again. She reared her brood, and removed it out of harm's way as soon as she could.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE fortieth annual meeting was called at the Royal Society's Hall for Monday evening, 14th June, 1920.

Owing to the strike of gas-works *employés*, &c., neither gas nor electric light was available, candles being substituted, while the consequent curtailment of the tramway services affected the attendance, which numbered about twenty members.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and said that after dealing with any correspondence and the election of new members the business of the annual meeting would be postponed until the next monthly meeting.

CORRESPONDENCE.

A letter was read from Colonel J. M. Semmens, Chief Inspector of the Fisheries and Game Department, asking for the appointment of two members to meet two members of the Australasian Ornithologists' Union and confer with him regarding the question of granting permits for the collection of eggs of protected birds for scientific purposes.

After some discussion as to the position to be taken up, seeing that the Club had at its last meeting decided against the proposal, Messrs. J. A. Kershaw, F.E.S., and G. A. Keartland were appointed to represent the Club.

ELECTION OF MEMBERS.

On a ballot being taken, Mrs. George, care of Mrs. Irvine, 9 Park-street, Ivanhoe, and Mr. Clyde D. Gillies, M.Sc., 61 Wellington-street, Windsor, were duly elected as ordinary members of the Club.

The meeting then adjourned.

EXCURSION TO ROSEBUD.

THE Easter excursion was this year fixed for Rosebud, a fishing village on the south-eastern shore of Port Phillip Bay, and about three miles distant from that well-known watering-place, Dromana. On Good Friday morning (2nd April) eleven members and friends proceeded by the s.s. *Hygeia* to Dromana, and thence by drag to their destination. Rosebud is becoming a popular tourist resort during the summer season. Accommodation had been arranged for at "Parkmore," within two hundred yards of a clean sandy beach, where there were ample

bathing facilities. The main Melbourne-Dromana-Sorrento road runs within a short distance of the beach, and between them is usually a dense thicket of shrubby plants of various kinds. On the landward side of the road there is a considerable amount of settlement, while further over towards the ocean beach is a large extent of wind-blown sand-dunes, with limestone underlying. This is also in a great measure covered with thick scrub characteristic of the coastal fringe. The well-known range of Arthur's Seat slopes down nearly to Rosebud. The range is granitic in character, and the resultant soil has a fairly thick vegetation, in which eucalypts and introduced pines attain a sturdy growth and considerable height. On the south-eastern side of Arthur's Seat, and also eastwards, Ordovician formations come in contact with the granite, while westwards, towards Sorrento, sand-dunes and limestone, with occasional swampy areas, occur. During the afternoon of Friday a short ramble was taken into the scrub at the back of the hamlet, and familiarity obtained with the local vegetation. Saturday was devoted to a drag excursion to Cape Schanck, about twelve miles distant (the military survey map, "Sorrento," will be found useful for following the tracks of the party). Fortunately, the rain which had threatened held off, and a pleasant day was spent. The lighthouse on the Cape was visited, and the fine panoramic view greatly admired. Some time was spent on the ocean beach, where Mr. Gabriel succeeded in obtaining a considerable variety of seaweeds, bryozoa, &c. The cliffs here are of volcanic origin, the vertical section showing at least two distinct lava flows. The basalt exhibits plainly both tabular and columnar structure, and less clearly the "onion" or concentric formation, whilst successive stages of disintegration, from solid black stone to soft white clay, through atmospheric and chemical agencies, are easily seen. The origin of this ancient flow is somewhat obscure, the nearest occurrences being at Balcombe Bay and Phillip Island, while Mount Duneed, to the south of Geelong, is probably the nearest volcanic vent. Attention was given here to the coastal flora, of which the Coast White-bush, *Calocephalus Brownii*, growing in large clumps, was the most prominent plant. On our return to Rosebud Mr. Gabriel gave a practical demonstration of the recognized method of mounting seaweeds and the preparation of bryozoa as opaque microscopic objects. Starting early on Sunday morning, the ascent of Arthur's Seat was made. The peak is of historic interest, for it was named by Lieut. Murray, R.N., the discoverer of Port Phillip Bay, and ascended by Capt. Flinders during his memorable voyage in the *Investigator*. From the tower, 1,200 feet above sea-level, the outlook is extensive, embracing

Port Phillip and Western Port Bays, Phillip Island, the Nepean Peninsula, and the Bellarine Peninsula as far as Barwon Heads, whilst across Port Phillip the You Yangs stand as striking as on the day when Flinders first saw them from the vantage-point of this peak, and resolved to make their ascent. On the western slope is a memorial cairn marking the visit of Flinders. Arthur's Seat and ridges consist of a rather friable granite, seldom leaving residual boulders. The vegetation is neither very prolific nor varied, the two Casuarinas, *C. stricta* and *C. suberosa*, with the eucalypts *E. viminalis*, *E. amygdalina*, *E. Stuartiana*, *E. obliqua*, and, less frequently, *E. coriacea*, and the Native Cherry, *Exocarpos cupressiformis*, as the principal trees. After lunch a quiet afternoon was spent on the beach and in the examination of the coastal strip of scrub, the chief features of which are the dense growth of the Sand-stay, *Leptospermum lævigatum*, *L. scoparium* being occasionally met with, and the fine growth and abundance of the Coast Honeysuckle, *Banksia integrifolia*, which, being in full flower, was an attraction to scores of Wattle-birds, *Anthochaera carunculata*, whose raucous notes could be heard from sunrise to dark. Other characteristic coast plants were *Alyxia buxifolia*, the Sea Box, *Leucopogon Richei*, the Coast Beard-Heath, *Goodenia ovata*, the Hop Goodenia, *Myoporum insulare*, the Coast Boobialla, *Correa alba*, White Correa, was in fine bloom, as also the pretty *Mimulus repens*, Large Monkey-flower. The succulent Mesembryanthemums, or Pig-face, *M. australis* and *M. triangularis*, grew freely, as also did the Bower Spinach, *Tetragona implexicoma*; the Climbing Lignum, *Muehlenbeckia adpressa*, and the Coast Acacia, *A. longifolia*, var. *sophora*, were frequently observed. Of the mistletoes, both *Loranthus celastroides* and *L. pendulus* had obtained footing on their several hosts. Specimens of the Lofty Pine, *Pinus excelsa*, the Common Poplar, *Populus alba*, and *Pittosporum undulatum* were noted amid the scrub, probably the result of wind-borne or bird-borne seeds. On Monday morning we started off southwards for some distance through scrub in which the Cherry Ballart, *Exocarpos cupressiformis*, and the Acacias, *A. verticillata*, *A. mollissima*, and *A. longifolia*, were frequent. The Swamp Paperbark, *Melaleuca ericifolia*, and the small-flowered *M. parviflora*, grew closely together in congenial soil, while shapely specimens of the Drooping Sheoke, *Casuarina stricta*, showed full inflorescence. The party, while ascending a steep ridge through heathy undergrowth, became divided, and only two reached the proposed destination, Waterfall Gully; the others, still ascending, reached a position immediately over a precipitous valley. The striking feature of this walk was the

prevalence of Grass-trees, *Xanthorrhoea australis*, many of the flowering spikes of which were from ten to fourteen feet in height. One grass-tree had a bifurcated stem. Two or three early flowers of the common Epacris, *E. impressa*, were found, also a few late blooms of the Shrubby Everlasting, *Helichrysum ferrugineum*. The only other plant in flower was the little autumnal orchid, *Eriochilus autumnalis*. An early return had to be made to speed the departure homewards of two of our company. On Tuesday morning another attempt was made to find Waterfall Gully, and with success. Along the creek we found several species of ferns fairly abundant. The Prickly Tree-fern, *Alsophila australis*, and the Fishbone-fern, *Lomaria discolor*, were growing well despite the dryness of the season, whilst the Rat-tail Spleenwort, *Asplenium flabellifolium*, the Common Maiden-hair, *Adiantum athiopicum*, the Rock-fern, *Cheilanthes tenuifolia*, and the rarer Rasp-fern, *Woodwardia (Doodia) aspera*, grew up the valley. The little stream was followed to the foot of the fall, but there was little water coming over the rocks. A speedy return had to be made in order to get lunch, pack our luggage, and get to Dromana to catch the steamer for home. Altogether, some 175 species of plants were noticed during our rambles. Of birds the following were listed :—White-backed Magpie, Kookaburra, Bronze-winged Pigeon, Pied Grallina, Derwent Jackass, White-shafted Fantail, Rufous Fantail, Diamond-bird, Boobook Owl, Wattle-bird, Yellow-breasted Robin, Scarlet-breasted Robin, Fairy Martin, Brown Swamp-Hawk, Rosella Parrot, Blue Wren, Silver Gull, Pacific Gull, White-fronted Heron, Yellow-rumped Tit, White-eye, Bass Strait Tern, Harmonious Thrush, Crescent Honey-eater, White-throated Tree-creeper. Regarding mammals, we heard that wallabies are numerous in the thickest scrub on the range, and that koalas and 'possums are occasionally seen. Though rabbits are known in the district, we saw none. The only reptiles seen were a few lizards. Insects, too, except ants, were somewhat scarce. Mr. L. Thorn has given me the following notes regarding the butterflies noticed :—"During the Easter excursion to Rosebud the following butterflies were taken :—Painted Lady, Wood Brown (*Tisaphone abeona*), Silvery Xenica, and the Wanderer (*Danaida archippus*), while the Common Brown, Small Blue, and the Imperial White were seen on the wing, the last named, as usual, flying about the tops of the gum-trees."

To my co-leader, Mr. J. Gabriel, I am indebted for the following notes regarding the Bryozoa (often called Polyzoa), a group to which he devoted his attention. He says :—"The beach at Rosebud afforded a very poor field for the gathering of Bryozoa, being too sandy : for this group of animal life a

rocky shore is more likely to yield good results. This was proved during our visit to the ocean beach at Cape Schanck. Here, in a couple of hours, in a snug little corner of about one hundred and fifty feet in extent, about twenty species were collected. I am often asked, 'How do you find these things?' My reply is, 'Go to some unfrequented part of the coast, especially after a storm, when masses of seaweed have been thrown up by the waves. Turn these over, and you will soon find the objects of your search. They may be attached to the roots of the kelp, &c., or entangled among the seaweeds washed up.' On a large clump of *Amathia australis* we found many interesting forms. Several species of *Catenicella*, commonly called 'Curly Seaweeds,' also yielded other forms. Many of the species are very beautiful as microscopic objects, such as *Crisia acropora*, *C. margaritacea*, *Bicellaria ciliata*, *Menipea cyathus*, and *M. crystallina*, but the pride of place must be given to *Chlidonia dædala*, which is generally found attached to *Catenicella margaritacea*. Altogether, we found more than a score of different species. The following are the species identified: — Cheilostomata. — *Dimetopia cornuta*, Busk., *Catenicella hastata*, Busk., *C. intermedia*, M'G., *C. margaritacea*, Busk., *Claviporella geminata*, Wyv. Thomson, *Scrupocellaria cyclostoma*, Busk., *Caberea Darwinii*, Busk., *C. glabra*, M'G., *Menipea crystallina*, Gray, *M. cyathus*, Wyv. Thomson, *Didymia simplex*, Busk., *Cellaria hirsuta*, M'G., *Pyripora polita*, Hincks, *P. crassa*, M'G., *Hiantopora ferox*, M'G., *Microporella diadema*, var. *lata*, M'G., *M. diadema*, var., M'G., *Bracebridgia pyriformis*, Busk., *Cellepora glomerata*, M'G., *C. lirata*, M'G., *Tubucellaria hirsuta*, M'G."

With good weather conditions, comfortable quarters, and harmonious relations, the party had a very pleasant Easter outing.—C. DALEY.

THE LATE MR. R. A. BASTOW.—By the death, on the 14th of May, of Mr. R. A. Bastow, at the age of 80 years, the Field Naturalists' Club lost another of its members. He was an ardent cryptogamic botanist, but for some years had not been able to follow his hobby. His last contribution to the Club was a chatty paper, "Notes on the Lichen Flora of Victoria," published in 1913. Mr. Bastow's profession as an architectural draftsman enabled him to illustrate his papers with great detail, and the plate accompanying this paper contains figures of 112 species, small but quite clear. He had resided in Tasmania for some years before coming to Victoria, and in the "Proceedings of the Royal Society" published several papers dealing with cryptogamic subjects. A "Key to the Mosses of Tasmania" in the volume for 1886, is a good example of his work.

NOTES ON THE COLEOPTERA OF NORTH-WESTERN
VICTORIA.

PART VIII.

BY J. C. GOUDIE.

(Read before the Field Naturalists' Club of Victoria, 12th April, 1920.)

SCARABÆIDÆ (*continued*).

SUB-FAMILY CETONIDES.

2574. *Chlorobapta* (*Schizorrhina*) *frontalis*, Don.
 2583. *Trichaulax* (*Schizorrhina*) *philipsii*, Schrieb.
 2601. *Diaphonia* (*Hemichnoodes*) *mniszeczkii*, Jans.
 2605. *Metallesthes* *metallescens*, White.
 2606. *Pseudoclitiria* (*Metallesthes*) *ruficornis*, Westw.

The Cetonides are a favourite group with collectors, some of them being amongst the most beautiful of Australian beetles. Mr. Lea has published a fine monograph dealing with the group. Writing of *C. frontalis* he says:—"This common and widely distributed species is the most variable of all the Australian Cetonides." It is black, with green and yellow markings on the elytra and prothorax. It breeds in hollow trees, emerging in the perfect state in January.

T. philipsii, about the same size as the preceding (seven-eighths of an inch), is a much rarer species. My single specimen, taken on the blossoms of a grey box tree, has the prothorax and scutellum dark red. The five ridges on the elytra are shining black, the grooves between clothed with short greyish hairs.

D. mniszeczkii is a fine large beetle, up to 1½ inches in length, of a pale straw colour, with a large dark trapeziform mark on the prothorax. Mr. Lea remarks:—"The male of this fine species (which occurs from the Mallee districts of Victoria to the coast of Western Australia as far north as Geraldton) may be readily distinguished from all the Australian Cetonides by the dense clothing of the pygidium and under surface and by the deep impression occupying the greater portion of the abdomen." About twelve years ago this species appeared in fair numbers, feeding on the mallee blossom, but has not been seen since.

M. metallescens is black, with a metallic gloss, and is about three-quarters of an inch long. I once saw a number of these beetles flying round the tops of a clump of the "Sand-hill" or "Scrub" Pine, *Callitris verrucosa*. They were being chased and captured by several of the large and powerful "Robber Flies," *Phellus glaucus*, but in every instance after being caught and examined the beetles were released and flew away apparently unhurt.

P. ruficornis is a smaller and rare species. The head and

prothorax black, with a metallic gloss; the elytra piceous, with a bronzy metallic tint. My specimens were taken on low scrub.

BUPRESTIDÆ.

The beauty of form and colour of the Buprestidæ is well known, and excites the admiration of all. Naturally, collectors of coleoptera are particularly keen on them, and cheerfully face the discomforts of the hottest day in the bush in the hope of adding to the collection. They are essentially beetles of the summer, occurring mostly during the months of November, December, and January. In this district many of the species frequent the tops of the mallee scrub when the latter is in blossom, and are captured by carefully bending down the slender tops with the aid of a long hooked stick and shaking them into an expanded umbrella. Low bushes and shrubs, such as acacias, &c., are also favoured by them, and some species are only to be found on a particular species of shrub.

The wood-boring larvæ—elongate, somewhat flattened grubs, having the thoracic segments greatly enlarged—tunnel in the roots, stems, and branches of various trees and shrubs.

In 1916 Mr. H. J. Carter, of Sydney, the well-known authority on Buprestidæ, contributed a paper to the Royal Society of South Australia, entitled "Revision of the Genus *Stigmodera*, and Descriptions of Some New Species of Buprestidæ."* In this valuable memoir, which should be in the hands of every student of the group, the author tabulates no less than 318 species of *Stigmodera*, and this after 204 names have been sunk as synonyms!

In compiling the list of local species I have included all the synonyms as given by Mr. Carter, and have followed his arrangement of the species of *Stigmodera* under the sub-genera *Themognatha* and *Castiarina*, none of the typical *Stigmoderæ* of Kerremans being found in this region. The numbers given are those of Masters's "Catalogue."

2623. *Diadoxus erythrus*, White.

2624. *D. scalaris*, L. and G.

These common and handsomely marked species appear to breed exclusively in the Murray pine.

Astræus irregularis, V. de Poll.

An extremely rare species, about three-quarters of an inch long. The head and prothorax are dull purple, with yellow spots; the elytra yellow, with bluish markings, forming a curious intricate pattern. It was described by Van de Poll from a unique specimen in his collection. One of my speci-

* "Transactions of the Royal Society of South Australia," vol. xl., 1916.

mens was taken (at Birchip) in its tunnel in a branch of the "bull-oak," *Casuarina Luehmanni*. Two others were taken on the foliage of the same tree at Green Lake, near Sea Lake, 25/1/16.

A. major, Blackb.

This also is a beetle rarely met with. It is about the same length but more robust than *irregularis*, the prothorax black or bluish, the elytra yellow, with three broad transverse blue bands, and a small red spot at the apex of each elytron. Taken on mallee foliage in October.

Bubastes, sp.

One species at least of this fine genus occurs here, but, owing to the similarity of the species to each other, it is difficult to identify them. The head and ample prothorax are blue, the ribbed elytra coppery, without markings. It is nearly an inch in length, and is found on mallee shoots in February.

Strigoptera australis, Blackb.

A handsome beetle measuring about an inch, with prothorax and under parts purple and the ribbed elytra dark green. Twenty years ago it used to occur in considerable numbers in the Birchip district, appearing about the middle of January, when it would be found in the mornings clinging to the wheat stubble, low mallee shoots, &c. At that time I sent many specimens to Mr. C. French, F.L.S., whose collection of Buprestidæ (now in the National Museum) is one of the finest in Australia.

2671. *Melobasis cupreovittata*, Snd. = *vittigera*, Thoms.

M. gratiosissima, Thoms.

2681. *M. nervosa*, Boisd. (?)

2689. *M. sexplagiata*, L. and G.

2691. *M. splendida*, Don.

These are small species, *M. cupreovittata*, a little over half an inch, being the largest, but they are very handsome, the rich combination of brilliant metallic tints being very striking. They are found on acacias and other small shrubs, and on eucalypt blossoms. *M. splendida* is fairly common, but is only taken on the Turpentine or Rosin-bush, *Beyeria viscosa* (?), in this district.

Anilava platessa, Thoms.

A. uniformis, Kerr.

Very small, dull-coloured species, often found amongst dry leaves.

2704. *Necuris asperipennis*, Fairm.

2707. *N. dichroa*, Fairm.

2708. *N. discolorata*, Fairm.

These small and rare beetles are seldom taken in the open, most of my specimens having been cut out of the wood of a tree locally known as the "dogwood." In early November this tree is covered with a profusion of beautiful white blossoms, on which insects of many kinds come to feed.

2718. *Curis aurifera*, L. and G.

2723. *C. corusca*, Waterh.

2730. *C. viridicyanea*, Fairm.

The species of *Curis* are much sought after by collectors on account of their beauty and scarcity. *C. aurifera*, about half an inch long, is blue and gold; *C. corusca*, a larger species, is brilliant metallic green, with coppery reflections; and *C. viridicyanea* has the prothorax blue, the elytra of a vivid deep green. I have taken it on the foliage of the Quondong, *Fusanus acuminatus*, in November.

2738. *Julodimorpha bakewellii*, White.

A fine species, one of the giants of the group, measuring $2\frac{1}{4}$ inches in length. The head is green, prothorax red, the deeply-pitted and ribbed elytra yellow. I have never met with it in the district, but Mr. H. W. Davey, F.E.S., informed me that he had seen specimens from Lake Tyrrell.

GENUS STIGMODERA.

"Sub-genus B.—THEMOGNATHA: elytra striate, tarsal hooks lobed or toothed at base."

2838. *Themognatha (Stigmodera) heros*, Gehin.

This is another of our largest species, some examples being $2\frac{3}{8}$ inches long by an inch broad. It varies from light to dark reddish-brown, with strong costæ on the elytra; the under side is dull metallic bronzy-green. Some seasons they appear in considerable numbers, then for two or three years none will be seen. It is a fine sight to see perhaps a score of these big beetles soaring majestically around, the loud, musical hum of their wings being audible at a distance of 50 yards. They are often killed by a large blue "robber fly," *Phellus glaucus*, which catches them on the wing, and drives its dagger-like proboscis deep into the soft integument between the prothorax and elytra. It then flies easily with its load, which is much heavier than itself, to the nearest post or tree, and proceeds to suck its victim dry.

2889. *T. parryi*, Hope, *fusca*, Snd., *parvicollis*, Snd., *major*, Waterh., *picea*, Kerr.

This is a much rarer beetle than *heros*. It is met with on low bushes in cultivation paddocks. Fresh specimens have considerable pubescence about the head and prothorax. It is an inch and a half in length, and of a dark brown colour.

2811. *T. donovani*, L. and G., *jansonii*, Snd.

A specimen of this is from the Murray, near Euston. It has the prothorax bronzy-green, with the margins yellow; elytra yellow, becoming red near apex.

2970. *T. vitticollis*, MacL., *delia*, Thoms., *fallaciosa*, Kerr.

Also from the last-named locality. This species is reddish-yellow: the centre of prothorax has a vertical black stripe. The rather broadly rounded apex of elytra is black, and there is a narrow black transverse bar about apical third.

2828. *T. fortnumi*, Hope.

A fine, showy species, extremely rare locally. A specimen was taken at Birchip over twenty years ago by Mr. D. Goudie. It was flying amongst a grove of bull-oak trees; it measures $1\frac{1}{2}$ inches in length, and is yellow, with the disc of prothorax and three broad bands on the elytra dark blue. While splitting posts and rails, &c., from the bull-oak timber I have found many insects, such as Longicornes, Buprestids, larvæ of wood moths, &c., but searched in vain for *fortnumi*. In several cases, however, the workings or tunnels of some large larva were traced, but these ended in the large oval exit-hole through which the beetle had previously emerged.

Sub-genus C.—CASTIARINA: elytra striate-punctate, tarsal hooks simple.

2945. *C. testacea*, Snd.

2874. *C. moribunda*, Snd., *dispar*, Blackb. (?)

2820. *C. flava*, Snd., *flavescens*, Thoms., *flavidula*, Kerr.

These are small beetles half an inch or less in length; *moribunda* has the prothorax and under parts bright green, elytra reddish-yellow.

2766. *C. bimaculata*, Snd., *punctiventris*, Snd., *guttata*, Blackb., var.—(1) *minor*, Blackb., (2) *ignea*, Blackb.

An extremely variable species, both in size and colour. It varies from less than half an inch to nearly an inch in length. The prothorax may be either bright green, bronzy, or coppery, while the elytra vary from pale yellow without markings (these have the bright green prothorax) to bright red, with strong black, blue, or green markings.

2876. *C. mustelamajor*, Thoms., *gibbosa*, MacL.

2826. *C. flavosignata*, MacL., var.

2816. *C. elongatula*, MacL.

2804. *C. decemmaculata*, Kirby, *inequalis*, Kerr.

2969. *C. vittata*, Snd.

The last three named are fairly common species, being found on flowering shrubs on white sand-hills. They are narrow and

elongate. The other two are rare. All are small—half an inch or less.

2882. *C. auricollis*, L. and G., var. *ochreiventris*, Snd., *strigata*, MacI.

A rare beetle. My specimen has the prothorax dark purplish-blue, elytra light yellow, with the apex and six spots (two of which are on the suture) blue. In the typical examples I believe the spots are replaced by transverse bands, but all that I have seen from this district were marked with spots, as described above. Taken on grey box blossom in December.

2825. *C. flavopicta*, Bois., *bicolor*, L. and G., *colorata*, Hope.

2935. *C. simulata*, L. and G., *helenæ*, Hope, var. *phryne*, Thoms., var. *lais*, Thoms., var. *tiramosa*, Thoms., *distinguenda*, Thoms., *fraterna*, Kerr.

This prettily-marked and variable species with the heavy burden of names is found on the "broom" tea-tree in the white sand-hill country.

2849. *C. jekelli*, Snd.

Very similar to some forms of *bimaculata*, but "apices of elytra with minute excision, not bispinose."

2831. *C. gibbicollis*, Snd., *fascigera*, Kerr.

This red and black species used to be fairly common in the Birchip district, but I have never taken it except on the "dogwood" blossom.

2867. *C. marginicollis*, Snd.

A fine and rare beetle. It is about $\frac{5}{8}$ of an inch in length : dark yellow, with wide black transverse bars.

2911. *C. robusta*, Snd.

About the same size as preceding. It has the prothorax blue, elytra bright red—in some with apex and two sutural spots blue, in others with transverse blue bands.

C. pisciformis, Carter, Tr. Roy. Soc. S. Aust., vol. xl., 1916, page 125, Pl. x., fig. 20.

Very similar in general appearance to *T. thomsoni*, but the black markings not so broad, also "differs from the latter besides markings in less sinuate and more attenuated form, and its flat and distinctly punctate elytral intervals."

C. cara, Black (?), *placens*, Kerr.

I have two specimens which probably represent this species. They are yellow, with black transverse bands and bronzy prothorax, and measure about $\frac{5}{8}$ of an inch.

2775. *C. castelnaudi*, Snd., *thomsoniana*, Masters, *laportei*, Kerr.

A study in brilliant red and blue. In some specimens the

transverse markings are green instead of blue. It is $\frac{3}{4}$ of an inch long. One of the finest of Mallee beetles.

C. signata, Kerr.

A small yellow and black species, fairly common in some seasons on the mallee blossom. "May be a variety of *distinguenda*, Snd."

C. eremita, Blackb., var.

This is a pretty yellow and blue species, slightly over half an inch in length. The prothorax has narrow yellow margins

2981. *Merimna (Chrysobothris) atrata*, L. and G.

A common and widely spread species, known in many places as the "fire-beetle," from a curious penchant it has for the vicinity of fires. A burning tree or log is a favourite place on which to settle, and it will even fly indoors to the fireplace. It is entirely black, with slightly ribbed elytra, and measures up to $1\frac{1}{4}$ inches.

Ethon.

Two species of this genus (unidentified) occur in the Sea Lake district.

3012. *Cisseis nubeculosa*, Germ. (?)

The species of *Cisseis* are pretty little beetles, found usually on wattle scrub.

3026. *Paracephala pistacina*, Hope.

This is a small species, less than $\frac{1}{4}$ of an inch. It is metallic bronze-coloured, and was found abundantly on grass-stalks.

Germanica lilliputana, Thoms.

As its name indicates, this is a very small beetle, measuring only 2 mm. It is generally (if not exclusively) taken on the foliage of the *Casuarinas*.

3028. *Agrilus australasie*, L. and G.

A narrow, coppery-brown species, about $\frac{3}{8}$ of an inch in length, having whitish pubescence on the under side.

BORONIA PINNATA.—In November, 1917, Mr. P. R. H. St. John obtained from Labertouche a supply of *Boronia pinnata*, Smith, when in flower, from which he distilled a small quantity of oil. This was submitted to Mr. Hy. G. Smith, F.C.S., of the Technological Museum, Sydney, who has recently published in the "Proc. Roy. Soc. Vict." (vol. xxxii., n.s., p. 14) the result of his examination of the oil. This shows that about 70 per cent. of the oil consists of Elemicin, a somewhat rare plant product, hitherto found only in a Manila plant, *Canarium commune*, L., belonging to the order Burseraceæ, an order far removed from the Rutaceæ, to which the *Boronia* belongs, in the usual arrangement of botanical species.

PLATE I.



FIG. 3—TRAVERTINED ROOTS OF OAKS
(CASUARINA), OAKY CREEK, TAEMAS, YASS, N.S.W.

Photo. by A. J. SHEARSBY.

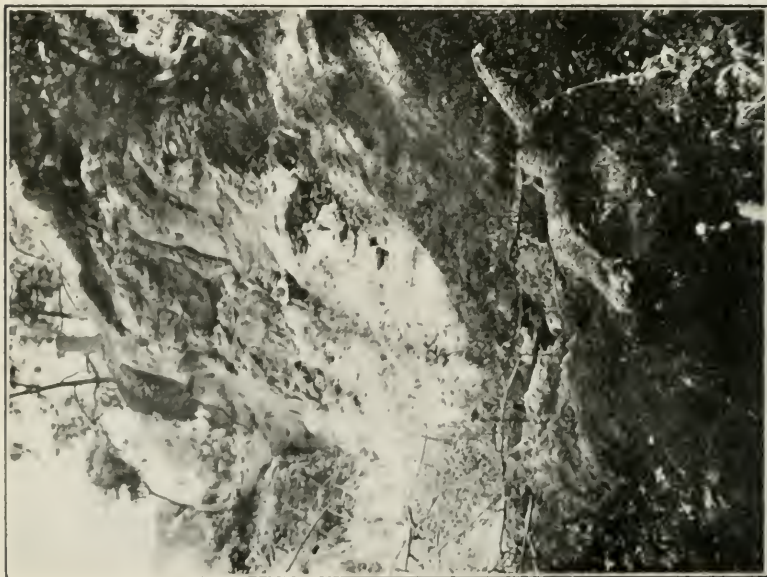


FIG. 1.—MASSIVE TRAVERTIN IN OAKY CREEK,
TAEMAS, YASS, N.S.W.

Photo. by A. J. SHEARSBY.

NOTES ON THE OCCURRENCE OF RECENT TRAVERTIN FORMATIONS IN OAKY AND RAVENSWOOD CREEKS, NEAR YASS, NEW SOUTH WALES.

BY A. J. SHEARSBY, F.R.M.S.

(Communicated by F. CHAPMAN, A.L.S.)

(Read before the Field Naturalists' Club of Victoria, 18th March, 1920.)

[NOTE BY F. C.—A few months ago Mr. A. J. Shearsby was good enough to send me the photographs here reproduced, together with some notes on the formation of the travertin. Recognizing the value to geologists of Mr. Shearsby's observations, I wrote to him for permission to present them to the Field Naturalists' Club of Victoria, which he readily granted. I have appended a few notes of my own regarding similar occurrences in the geological series.]

MASSIVE travertin in Oaky Creek, portion 65, parish of Taemas, near Yass (fig. 1):—"This is typical of the deposit forming and already formed at Oaky Creek. All the 'rock' here shown is travertin. Even the foreground on which the log is lying is solid stuff, on which the grass and watercress, &c., grows profusely for a while, and is then coated over with the calcareous material, thus adding to the thickness of the already massive travertin.

"The man in the centre of the picture will give an idea of the thickness of the deposit. Note also the oak trees (*Casuarina*) growing out of it at the top. The roots are responsible for a further thickening of the deposit (see fig. 3)."

Stalactitic travertin formed on moss, Oaky Creek, Taemas (fig. 2):—"This photograph shows a little grotto in the face of fig. 1, but about 20 feet to the right. Note the stalactitic formation of the travertin. All of these stalactites are formed on a matrix of moss, which keeps on growing outwards and downwards as the stalactites thicken with the calcareous deposit, and in time join up to each other and form a solid mass. The deposit here is very rapid in growth, and in at least four instances the calcareous water may be noted pouring in a continuous stream from the stalactities. The foreground of the photograph is a matted mass of grass in various stages of 'petrification' (incrustation). A two-foot rule folded to one foot is standing to the left to give an idea of proportion."

Travertined roots of oaks (*Casuarina*), Oaky Creek (fig. 3):—"This adjoins fig. 2, and shows the roots of the *Casuarina* being rapidly thickened and cemented together by a calcareous spring. The roots, which form only a small central portion of the thick pendants shown, are at present alive, and will later on send out fresh rootlets, which, in turn, will be covered up.

The original roots finally die, and help to form the solid material which may be seen between the rule and the comparatively fresh-looking roots.

"The growth of the travertin this year (1919) is very rapid, as the rainfall has been very light and evaporation abnormal, the result being that, as the spring issues very highly charged with lime, and flows over such a mass of moss, grass, roots, and watercress, that it is all evaporated before it travels far, and all the organic matter is left *in situ* coated and cemented together into a porous limestone."

In the Oaky Creek locality the lime is leached out of the Devonian limestones.

Travertin, Ravenswood Creek, portion 79, parish of Boambolo, Yass.—A small specimen of this travertin is exhibited, which is typical of a deposit that may be traced along Ravenswood or Hall's Creek for about two miles.

The specimen in this instance is composed of incrustated mint, which thrives very luxuriantly all along this creek. In many places the mint is crowded out by watercress and *Chara*, both of which are also travertined and help to form solid masses of calcareous rock. In this locality I have also picked out lime-incrustated fruits and leaves of *Eucalyptus*, shells of the pond snail *Limnæa*, and portions of insects. This locality has also a more solid deposit, which L. F. Harper* noticed is often ripple-marked. The lime in the Ravenswood area is leached out from the Silurian limestones which outcrop there.

Mr. Harper also refers to another class of Secondary Limestone:—"A totally different class of deposit of recent age is found on the slopes of the Devonian limestone outcrops. It consists of a limestone breccia, usually about eight inches thick, which owes its origin to a re-cementing of the shale and limestone talus. The breccia rests on top of shales with chocolate-coloured bands and tuffs, and is quite hard and compact in places, whilst in others it is more friable."†

A very similar formation to the above is to be noticed in the Silurian deposits at Hatton's Corner, Yass.

ADDENDUM ON TRAVERTIN IN GENERAL, BY F. CHAPMAN, A.L.S.

Deposits of travertin on vegetation and terrestrial *débris* are more often found in the later formations, Tertiary and Post-Tertiary. The present interesting occurrence reminds one of the deposits formed from the dripping wells of Knaresborough, in Yorkshire, and in Derbyshire. Shaupe has

* L. F. Harper, *Rec. Geol. Surv. N. S. Wales*, vol. ix., 1909, p. 11.

† *Loc. supra cit.*, p. 11.

PLATE 2.



FIG. 2.—STALACTITIC TRAVERTIN FORMED ON MOSS. OAKY CREEK, TAEMAS, YASS. N.S.W.

Photo. by A. J. SHEARSBY.

described * a remarkable occurrence of a mass of incrustated plants of the lime-secreting *Chara*, filling up an old pool near Northampton.

How perfectly the impressions of vegetable matter may be retained by the incrusting substance can be realized from the description given by Prof. Seward † of a porous calcareous rock of Eocene age near Sézanne, Southern France, formed of encrustated leaves, twigs, and flowers; these have been restored to their original delicate shapes by forcing wax into the cavities and dissolving away the tufa.

The travertin deposits near Geilston and Hobart, Tasmania, described by Johnston, ‡ were also formed in lakes fed by calcareous springs, and the leaves which were washed into them (*Notofagus Risdoniana*) are beautifully preserved as impressions.

In some ways allied to tufa deposits is the phenomenon of the lime-incrustated stems and roots of the Coast Tea-tree (*Leptospermum lævigatum*), which in later stages become solidified by deposits of carbonate of lime from solution. This has engaged the attention of observers from the time of Vancouver (1791), and Darwin (1836) commented upon it. As Dr. T. S. Hall pointed out § in his valuable paper on this subject, it remained for Moseley, || of the *Challenger* expedition, to explain the actual facts respecting the formation of this coastal tufa, which, unlike most other deposits, seems to be dependent on the acids derived from the decay of the vegetation itself in its reaction on the calcareous shore-sand.

The older groups of rocks, of the ages of Silurian, Devonian, and Triassic, contain limestones of algal and other plant origin, but their age and consequently greatly altered mineral condition often precludes a very close analogy with the modern deposits of like origin, although in certain instances conspicuous intercalations of calcareous tufa can be clearly seen. Thus, the Upper Devonian of Freestone Creek, Gippsland, contains a typical tufa deposit which is associated with plant-bearing sandstones.

In the study of agencies which produced any geological formation, it is of the greatest value to obtain evidence of similar conditions taking place at the present time, and such an instance as Mr. Shearby has so well described and photographed makes us familiar with the actual mode of formation

* *Geol. Mag.*, vol. v., 1868, p. 563.

† "Fossil Plants," vol. i., 1898, p. 70. Also Saporta, *Mem. Soc. Geol. France*, vol. viii. (2), 1865-8.

‡ *Geol. Tasmania*, 1886, p. 286. See also *Proc. R. Soc. Tas.* for 1879 (1880), p. 81; 1881 (1882), p. 7.

§ *Victorian Naturalist*, vol. xviii., 1901, p. 47.

|| "Notes by a Naturalist on the Voyage of H.M.S. *Challenger*," p. 149.

of these deposits. Several factors bear on the subject, chief of which is the varying amount of carbonate of lime carried in the water, partly dependent upon the minimum or maximum amount of rainfall in the area. In the present case it would be interesting to note, over a period of a few seasons, the variation in the amount of the deposit laid down, as an index to the rapidity of such formation under average conditions.

It may not be out of place to mention here a case of sudden cessation of a travertin deposit due to diversion or spreading of the stream or spring, at a locality the writer visited at Blashenwell, in Dorset.* This travertin deposit had been forming for many centuries, sealing up relics of Neolithic times, as seen in the enclosed bones of pig, red deer, roe deer, and a large ox used for food, together with flint flakes, limpet shells, and charcoal. The succeeding layer of black soil contained Roman coins at the base, and these remained silent witnesses of the period when the spring had ceased to deposit tufa.

A RARE ARACHNID.—When at Wallhalla last month I came across the curious arachnid exhibited this evening. It was found under a large stone in a very wet situation, having for company three small frogs. This arachnid can easily be distinguished from the Araneida by the cephalothorax and abdomen not being pedunculated, as in the latter. It belongs to the order Phalangiidæ; members of this order are often possessed of extremely long legs, but in this specimen the legs are of only moderate length. It possesses the typical characters of the Phalangiidæ in having only two eyes, placed on a small tower-like process on top of the cephalothorax, and having the mandibles armed with pincers, and an abdomen consisting of six segments. Each segment is papillose and of a coriaceous nature, which gives the abdomen a roughened appearance, very different from the pilose covering usual to the abdomen of a spider. The maxillæ are also very large and powerful; these are opposed to each other so as to act as crushing jaws. The second pair of legs have the tarsi composed of numerous small segments in somewhat similar manner to the tarsi of the first pair of legs of the tropical Whip Scorpions of the order Pedipalpi. The second specimen in the box is a small species fairly common in parts of Victoria, but the large specimen is the first I have seen, and is probably an undescribed species.—H. W. DAVEY, F.E.S. 10th May, 1920.

* Clement Reid, *Proc. Dorset Field Club*, vol. xviii., 1896, p. 67. Also Strahan, *Geol. I. of Purbeck*, 1898, pp. 210, 211.

PLATE 3.



SIR RONALD MUNRO CRAUFURD FERGUSON, P.C. G.C.M.G.,
GOVERNOR-GENERAL OF AUSTRALIA.

HON. MEMBER FIELD NATURALISTS' CLUB OF VICTORIA.

The Victorian Naturalist.

VOL. XXXVII.—No. 4. AUGUST 5, 1920.

No. 440.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE fortieth annual meeting of the Club was held at the Royal Society's Hall on Monday evening, 12th July, 1920.

The president, Mr. A. D. Hardy, F.L.S., occupied the chair, and about forty members and visitors were present.

CORRESPONDENCE.

From Prof. Georgina Sweet, D.Sc., Victorian local secretary of the Australasian Association for the Advancement of Science, notifying that the next meeting of the Association would be opened at Hobart on the 5th January, 1921, and asking the Club to appoint delegates on the council for the meeting.

Dr. C. S. Sutton and Mr. C. Daley, M.A., having expressed their intention of being present at the meeting, were appointed to represent the Club.

From the Acting Chief Inspector of Fisheries and Game, stating that it had been decided to limit the number of permits for collecting eggs of protected birds, and to confine them to genuine scientific workers. Collecting for trading purposes would be discouraged as much as possible.

The latter determination was taken exception to by several members, and the letter was referred to the committee for further consideration.

REPORTS.

A report of the excursion to Lilydale on Saturday, 17th April, was forwarded by Mr. R. E. Luher, B.A., who acted as leader in the unavoidable absence of the leader, Mr. F. Chapman, A.L.S. The party first visited the well-known Cave Hill limestone quarry, and spent some time in the search for fossils, with considerable success, a number of characteristic species being obtained, including a fine specimen of *Euomphalus*. The ascent was then made to the top of the hill, where the physiography of the district was pointed out, and the fine panorama greatly admired under the influence of a setting sun on an autumn afternoon.

A report of the excursion to Studley Park for geology on Saturday, 1st May, was forwarded by the leader, Mr. R. E. Luher, B.A. Though a somewhat bleak and showery afternoon, there was a fair attendance of members, who showed considerable interest in the story of the physiographical features of the park and its surroundings. It was shown by specimens of a graptolite, *Monograptus*, sp., that the rocks exposed in

the road cuttings are of Silurian age, and not Ordovician, as mentioned in the *Naturalist* of August, 1919. A visit was paid to Dight's Falls, and the hardened band of sandstone, with its many small quartz veins, which causes the fall, was pointed out, the ripple markings exhibited in many places pointing to the probability of deposition in shallow water.

A report of the visit to the National Museum on Saturday, 15th May, was given by the leader, Mr. J. A. Kershaw, F.E.S., Curator of Zoology, who said that members had been greatly interested in seeing the store-rooms and other portions of the Museum not accessible to the general public. Surprise had been expressed at the amount of material available for display when required, or for research work. A brief glance at the "H. L. White" ornithological collection concluded an interesting afternoon.

A report of the excursion from Evelyn to Mooroolbark on Monday, 7th June (King's Birthday), was forwarded by the leader, Mr. G. Coghill, who reported a fair attendance of members. The day was somewhat boisterous and unsettled; however, the members enjoyed the ramble. Flowers of about thirty species were noted, and, though not of any great interest, they were sufficient to indicate that the locality is worth visiting in the spring, when many others would deck the hillsides. A number of species of ferns were seen along the Lilydale water-race, and small specimens obtained for home cultivation.

A report of the visit to the National Herbarium on Saturday, 19th June, was forwarded by Mr. J. R. Tovey, who acted as leader in the unavoidable absence of the leader, Prof. A. J. Ewart, D.Sc., Government Botanist. The members were greatly interested in the historical treasures of the Herbarium—plants collected by Petiver (1703), Banks and Solander (1770), and Robert Brown (1802)—which have been referred to in previous notes about the Herbarium (*Vict. Nat.*, xxiv., p. 146; xxvi., p. 83; and xxxi., p. 69), and which are still in an excellent state of preservation. An inspection was made of the library, which contains many valuable works of pre-Linnaean authors, such as O'Brunfel's "*Herbarium Icones*" (1632), Fuchs's "*Historia Stirpium*" (1542), Dodoneus (1560), and Grew's "*Anatomy of Plants*" (1682), as well as a very large collection of all classes of works dealing with botany in its many aspects.

A report of the visit to the Geological Museum on Saturday, 10th July, was, in the absence of the leader, Mr. R. A. Keble, given by Mr. R. W. Armitage, M.Sc., who reported that there had been a fair attendance of members, who were very interested in the fine display of Victorian economic minerals, &c., and the information given about them.

ANNUAL REPORT.

The acting hon. secretary, Mr. E. E. Pescott, F.L.S., read the fortieth annual report for the year 1919-20, which was as follows :—

“ TO THE MEMBERS OF THE FIELD NATURALISTS' CLUB OF VICTORIA.

“ Ladies and Gentlemen,—In presenting the fortieth annual report of the Club for the year ended 30th April, 1920, your committee record their thanks for the hearty support of the members during the past twelve months.

“ At the beginning of the year the roll of membership numbered 233. During the year 15 ordinary, 5 country, and 2 associate members were elected; and, allowing for deaths and resignations, at the close of the year there were 246 enrolled, showing an increase of 13.

“ Early in the current year the Club lost by death one of its life members, Mr. B. R. Patey. Recently, it was our regret to sustain the loss of Mr. George Sweet, F.G.S., whose long-continued membership and whose valuable support were much appreciated. Another member, Mr. W. T. C. Kelly, also passed away, who, although a comparatively recent member, was a very enthusiastic one. To the relatives and friends the Club offers its deepest sympathy in their loss.

“ The monthly meetings have been held regularly, and the scientific as well as the popular side of the Club's work has been maintained in the usual high degree. There has been an average attendance of between 60 and 70 at the meetings, and the discussions and papers have been interesting and well sustained. Lectures and papers have been delivered on botany, ornithology, geology, physiography, and zoology, as well as on several general subjects, while the use of lantern views was frequent.

“ The following lectures and papers were delivered :—‘ A Weck among the Seaweeds at Portsea,’ by Mr. A. H. S. Lucas, M.A.; ‘ Gleanings of a City Naturalist,’ by Mr. J. Searle; ‘ About “ Pet Peter,” a Flying Phalanger,’ by Mr. J. Booth, M.C.E., B.Sc.; ‘ Birds of a Gippsland Garden,’ by Miss C. C. Currie; ‘ Growing Ferns in the Open,’ by Mr. A. H. S. Lucas, M.A.; ‘ Notes on the Coleoptera of North-Western Victoria,’ Parts VII. and VIII., by Mr. J. C. Goudie; ‘ A Girls' Camp at the National Park, Wilson's Promontory,’ by Miss G. Nethercote; ‘ At Wartook (Grampians),’ by Mr. C. Daley, B.A., F.L.S.; ‘ Wild Life in Tasmania,’ by Messrs. G. Weindorfer and G. Francis; ‘ On the Occurrence of Recent Travertin Formation near Yass, N.S.W.,’ by Mr. J. Shearsby, F.R.M.S.; ‘ Through the Murra Murra (Western Grampians),’ by Mr. J. W. Audas,

F.L.S. In addition, two popular evenings were held. The February meeting was devoted to 'Notes of Holiday Rambles,' and the following gave accounts of their Christmas holiday work:—Dr. C. S. Sutton, 'A Visit to Mud Island'; Mr. F. Pitcher, 'The Noojee Valley'; Miss G. Nethercote, 'To Mallacoota'; Mr. F. G. A. Barnard, 'A Trip to Britannia Creek'; Mr. C. Daley, B.A., F.L.S., 'From Alexandra to Healesville'; Mr. H. B. Williamson, 'At Mallacoota'; Mr. F. Chapman, A.L.S., 'Arthur's Seat District.' Messrs. F. Chapman and C. Lambert also showed an excellent series of slides of geological physiography of districts near Melbourne at the March meeting.

"The excursions of the Club have been regularly maintained during the past year, and the attendances of members and friends have been good. It must not be forgotten that we are a *Field Naturalists' Club*, and that the field excursions are among the more important work of the Club. The excursion programme extends from August to July. During the year excursions were made to thirty-two distinct places and localities, distant ones being made to Bendigo, Rosebud, to the Grampians, and to the Loch Valley. Over twenty subjects were studied and observed, and over two dozen members acted as leaders of the excursions.

"In February the committee entertained the members at the Zoological Gardens, where a successful social gathering was held and afternoon tea served. Thanks are given to Messrs. Le Souëf and Wilkie, who conducted the members round the Gardens.

"At the June meeting extra attention was given to the exhibition of specimens. There was a large attendance of members and friends, and the display of objects included all branches of natural history.

"It is always gratifying to record honours that have come to members of the Club. This time one of our old members, and one who has supported the Club as an officer and committeeman, and also by supplying valuable papers, Mr. Frederick Chapman, A.L.S., has added honours to the Club. Mr. Chapman was awarded the Syme prize of £100 by the University of Melbourne for his valuable work on paleontology. In addition, our distinguished fellow-member has been appointed Lecturer on Paleontology to the Melbourne University. The committee and Club wish him every success. Another distinction came to the Club in the early part of the year, when our fellow-member, Mr. F. Mann, M.A., LL.B., was elevated to a Supreme Court justiceship. The Club heartily congratulated Mr. Justice Mann on his acceptance of the position.

"After many years of successful labour as Professor of

Biology at the Melbourne University, Professor Sir Baldwin Spencer, K.C.M.G., M.A., D.Sc., retired from that position during the year. His place is taken by Professor Agar, D.Sc., of England. Professor Spencer is one of the past presidents of the Club, and has always been its ardent supporter. Your committee wish him a long and happy retirement.

"Your committee record with great pleasure that the conservation of our forests has now been established upon a satisfactory basis, and that a commission of three, with Mr. Owen Jones, of England, as its head, and with Messrs. Mackay and Code as his associated members, has been established. The commission is free from political control, and is proceeding to place the establishment and finances of our forests on a firm and permanent footing.

"The Plant Names Committee is still pursuing its laborious task of compiling vernacular names for our flora. The lists are now almost complete, and it is anticipated that during the coming year its labours will be completed in the publication of the revised list. Eighty meetings of the committee have now been held. Professor Ewart, F.L.S., has been chairman, and Dr. C. S. Sutton secretary, since its inception. Occasional changes have been made in the *personnel* of the committee, mainly owing to the removal of members from Melbourne. The following have been occupied in the work since its beginning:—Professor Ewart, D.Sc., Ph.D., F.L.S., Dr. C. S. Sutton, Dr. J. A. Leach, Messrs. F. G. A. Barnard, G. Coghill, J. P. M'Lennan, F. Pitcher, P. R. H. St. John, J. R. Tovey, J. Cronin, F.R.H.S., H. B. Williamson, J. W. Audas, F.L.S., C. Daley, B.A., F.L.S., A. D. Hardy, F.L.S., W. R. A. Baker, E. E. Pescott, F.L.S., and F. Morris. The members of the committee are now engaged in the preparation of the manuscript, which, when completed, will be placed in the publishers' hands. This work is being done in sections, each member having undertaken to prepare a section of an equal number of pages. It is proposed, when completed, that the 'List' will contain botanical name, vernacular name, duration and time of flowering, size of plant, colour, locality, habitat, uses, and general remarks, including also a brief key for the identification of the genera and species.

"During the year the opinion of the Club was sought by the Fisheries and Game Department as to the desirability of continuing egg-collecting permits, collectors being allowed under the permit to collect no more than three clutches of eggs of protected birds. The Department reported that only two permits were under issue. After extended discussion the Club resolved—'That the Club is decidedly opposed to the issue of the permits.' The Club having made complaint to the

same Department that increased havoc was being done by foxes to the Mutton-birds on Phillip Island, the Department arranged a 'fox drive' for May, 1920, at which ten foxes were shot.

"In connection with the National Park at Wilson's Promontory, its suitability as a permanent sanctuary for the native fauna and flora is shown by the good results following the introduction of native animals and plants not previously represented there. The honorary secretary, Mr. J. A. Kershaw, reports that, up to the present, 238 animals have been liberated. These include four species of kangaroos, three species of wallabies, two species of wombats, three species of opossums, Emus, Lyre-birds, Mallee Hens, Satin Bower-birds, Straw-necked and White Ibis, &c. The Emus and Red and Grey Kangaroos have noticeably increased in numbers, and there is every reason to believe that most, if not all, the other animals are now thoroughly established. Native Bears have increased to such an extent as to cause the destruction of a large number of eucalypts by repeated defoliation. Nearly fifty species of plants have been introduced, either by seeds or young plants. Young Cabbage-tree Palms, *Livistona australis*, planted in Lilypilly Gully nearly three years ago are apparently well established.

"It is gratifying to record that continued interest is being shown by public bodies in the native flora and fauna. At Preston the large and newly-opened Edwards Park is being planted with many Australian trees and shrubs, and the movement, in which the Club took part, to make this park a sanctuary for native birds and game has been successful in attaining its aim. A large area of land at Essendon was donated to the community by Mr. T. Napier, with the provision that the old gum-trees are to be preserved as long as possible. At Elsternwick Park two portions have been set apart for growing native flora, and beds for the same purpose are now established at the Flagstaff Gardens. The Camberwell City Council has acquired the well-known Australian garden of Mr. J. Watson, which is to be added to Beckett Park and kept as an Australian garden. At the Melbourne Botanic Gardens the Curator, Mr. J. Cronin, still continues to improve and add to the already splendid collection of native plants on the Australian border and elsewhere in the gardens.

"The annual exhibition of wild-flowers was held in the Melbourne Town Hall on 30th September, 1919. It was decided that the profits of this show should be equally divided between the 'Anzac House Fund' and the fund for the publishing of the 'Vernacular Plant Names List.' The show was as equally attractive as in previous years, and the attendance of members and the public was excellent. The display of

our indigenous flora was a splendid one, the Grampians exhibit being specially fine. There were also exhibits sent by curators of Botanic Gardens and friends from other States. The show was opened by Brigadier-General Brand, the State Commandant, and the profits yielded £167 3s. 5d. The thanks of your committee are cordially given to all ladies and gentlemen who so freely gave of their time and labour to make the show a spectacular, educational, and financial success.

"At the election of officers for the year, Mr. P. Crosbie Morrison was elected hon. secretary; but after several months of faithful work, acting under medical advice Mr. Morrison was compelled to resign his office. His place was taken by Mr. E. E. Pescott, F.L.S., who offered to act as secretary till the conclusion of the financial year.

"The editorship of the *Victorian Naturalist* has continued in the hands of Mr. F. G. A. Barnard. For many years this arduous work has been a labour of love to our hon. editor, and it is rare indeed to find any error in the journal, to which members look forward eagerly from month to month. Your committee desire to record with gratitude the great services rendered to the Club by Mr. Barnard. The *Naturalist* goes to all parts of the world, and the requests for its delivery to America, to Europe, and even to China and Japan, are increasing. It is to be regretted that a strike in the printing trade interfered recently with the continuity of publication—the first break in the thirty-five years' existence of the *Naturalist*; but publication has now, happily, been resumed.

"The library has been in the capable hands of Mr. P. R. H. St. John, who has continued to devote an extra night monthly to it, with Mr. W. Glance as assistant. Mr. Glance is also assistant secretary. To these, and others, your committee tender their grateful thanks for services rendered. The whole of the officers have always given hearty service, and the committee records with gratitude that during the forty years' work of the Club there has never been a paid officer.

"The committee desires to direct the attention of members to rule 9, which provides for the removal of names from the roll of members of those who owe two years' subscriptions or more. It may be pointed out that the cost of maintaining the Club is annually increasing, and that no increase has as yet been made in the subscription. Prompt payment of subscriptions on the part of the members relieves the treasurer of an immense amount of work, and enables the committee to know and to work on its resources.

"The committee desires to record with pleasure that the financial position of the Club is sound. It is feared that, owing to the increases in wages as a result of the printers' strike, the

cost of the production of the *Naturalist* may be increased in the near future. On that account alone the committee urge the prompt payment of subscriptions, so that the increase of the annual subscription, which sometimes seems inevitable, may be postponed as long as possible. The treasurer's report shows a credit balance of £72 8s. 10d., in addition to a War Loan bond for £20.

"Your committee again desire to heartily thank Messrs. Coghill and Haughton for their continued kindness in allowing the free use of their office for the monthly committee meetings. It is a great advantage to the individual members to be able to meet so centrally each month.

"In conclusion, your committee desire to express their satisfaction that their efforts to maintain the traditions of the Club, and to faithfully further its aims, have always been supported by the members. The committee trusts that the loyal support so given will be continued during the coming year, and that every effort will be made to increase the membership, so that the work and finances may both flourish.

"On behalf of the Committee,

"A. D. HARDY, *President*.

"ED. E. PESCOTT, *Hon. Secretary*.

"Melbourne, 2nd June, 1920."

On the motion of Messrs. P. R. H. St. John and H. B. Williamson, the report was received and adopted.

FINANCIAL STATEMENT.

The hon. treasurer, Mr. F. Pitcher, who paid a tribute to the fine work of his predecessor in office, Mr. G. Coghill, presented the financial statement for 1919-20, which was as follows:—

FINANCIAL STATEMENT.

The hon. treasurer, Mr. F. Pitcher, presented the financial statement for 1919-20, which was as follows:—

RECEIPTS.

To Balance, 30th April, 1919	...	...	...	£58 15 9
„ Subscriptions—				
Ordinary Members	...	£125 11 0		
Country Members	...	30 16 6		
Associate Members	...	2 7 6		
		—	£158 15 0"	
„ <i>Victorian Naturalist</i> —				
Subscriptions and Sales		8 8 3		
Advertisements	...	1 10 0		
Reprints	...	0 8 0		
		—	10 6 3	
„ Sales of Badges	..	...	0 14 6	
„ Interest, Savings Bank and War Loan	...	...	3 5 3	
			—	173 1 0

Brought forward	...	...	...	...	£231 16 9
To Wild-flower Exhibition—					
Admissions	...	...	163 13 0		
Sales of Flowers	...	...	55 14 3		
Donation	...	...	0 5 0		
				219 12 3	
Donation towards Publication of Plant Names	...	...	...	0 5 0	
					219 17 3
					<u>£451 14 0</u>

*Subscriptions :—Arrears, £28 13s. 6d. ; 1919-20, £121 19s. ; advance, £8 2s. 6d.—total £158 15s.

EXPENDITURE.

By *Victorian Naturalist*—

Printing (11 months)	...	...	£90 17 5
Illustrating	...	...	0 17 4
Free Reprints	...	...	3 10 0
Reprints charged	...	...	0 18 0
			<u>£96 2 9</u>

„ *Victorian Naturalist*—

Wrapping and Posting	...	...	18 18 5
Rooms—Rent and Attendance	...	...	13 15 0
Library—Periodicals	...	...	2 14 0
Insurance	...	...	0 7 0
			<u>3 1 0</u>
Hire of Lantern	...	...	1 10 0
Printing	...	...	16 3 6
Donation—Spencer Fund	...	...	1 1 0
Postages, &c.	...	...	8 16 3

„ Wild-flower Exhibition—

Hall and Attendance	...	20 15 0		
Piano and Orchestra	...	4 4 0		
Expenses	...	27 14 10		
			52 13 10	
Payment to Anzac House Fund	...	...	83 9 3	
Deposit in Savings Bank towards Publication of Plant Names, including Donation (see contra)	...	...	83 14 2	
				219 17 3
Balance in Savings Bank	...	...	54 8 4	
„ „ London Bank	...	...	18 0 6	
			<u>72 8 10</u>	
				<u>£451 14 0</u>

F. PITCHER, *Hon. Treasurer.*
28th May, 1920.

Audited and found correct.

14th June, 1920.

F. WISEWOULD, }
F. KEEP, } *Auditors.*

The following statement of assets and liabilities was also presented :—

ASSETS.				
Balance—Savings Bank and London Bank	...	...	£72	8 10
War Loan Bond	...	...	20	0 0
Arrears of Subscriptions (£60), say...	...	...	40	0 0
Library and Furniture (Insurance Value)	...	...	150	0 0
Deposit in Savings Bank for Plant Names Publication	...	...	83	14 2
			<hr/>	
			£366	3 0
			<hr/>	
LIABILITIES.				
Subscriptions paid in advance	...	...	£8	2 6
Deposit for Publication of Plant Names	...	...	83	14 2
			<hr/>	
			£91	16 8

On the motion of Messrs. E. Cox and C. Daley, M.A., the statement was received and adopted.

A vote of thanks to the officers for the past year, proposed by Mr. J. Stickland and seconded by Mr. E. Cox, was carried unanimously. The retiring president, Mr. A. D. Hardy, F.L.S., in acknowledging the vote, referred to the generous action of Mr. E. E. Pescott, who for several months had acted as honorary secretary when the Club was hard pressed to find a successor to Mr. P. C. Morrison, who had to relinquish the position owing to ill-health.

ELECTION OF OFFICE-BEARERS, 1920-21.

The following office-bearers, being the only nominations received, were declared duly elected :— President, Mr. J. Gabriel; hon. treasurer, Mr. F. Pitcher; hon. librarian, Mr. P. R. H. St. John; hon. editor, Mr. F. G. A. Barnard; hon. secretary, Mr. R. W. Armitage, M.Sc., F.G.S.; and hon. assistant secretary and librarian, Mr. W. Glance.

On a ballot being taken for two vice-presidents, Messrs. F. Chapman, A.L.S., and C. Daley, M.A., F.L.S., were duly elected.

On a ballot being taken for five members of committee, Messrs. G. Coghill, A. D. Hardy, F.L.S., J. A. Kershaw, F.E.S., J. Searle, and C. S. Sutton, M.B., B.S., were duly elected.

Mr. A. D. Hardy in vacating the chair, after two years' occupancy, in favour of the newly-elected president, Mr. J. Gabriel, thanked the committee and members for the assistance they had given him in carrying out his duties as president of the Club. He mentioned that he had prepared a presidential address reviewing the work of the Club and its possibilities, but owing to the lateness of the hour it must be taken as read, and would appear in the *Naturalist*.*

* [Owing to pressure of work, due to the recent strike, the address could not be set up in time for this number.—Ed. *Field Nat.*]

Mr. Hardy also announced that His Excellency the Governor-General, who is an hon. member of the Club, and who would shortly be leaving Australia, had presented a framed photograph of himself, which would be reproduced in the next *Naturalist*, as a memento of his association with the Club, and he hoped that before leaving His Excellency would forward a communication to the members.

On taking the presidential chair, Mr. Gabriel intimated that he would serve the Club to the best of his powers. He said that the Club could do more work, and that of a valuable nature. For instance, more could be done by a Club such as this in the investigation of insect and fungus pests; for example, the blight of the tomato. He cited Pasteur's salvation of the silk industry of France. This should be an inspiration. He asked—Why can we not have an Australian Pasteur?

GENERAL BUSINESS.

In accordance with notice, Mr. H. B. Williamson moved the motions standing in his name, as published in the *Naturalist* for June (page 9). Considerable discussion took place, and finally it was agreed that the several matters be considered by the committee with the view of meeting Mr. Williamson's ideas as far as practicable, Mr. Williamson agreeing to alter the word "considers" in the first motion to "suggests."

Mr. F. Pitcher referred to the acquirement of Mr. J. Watson's garden at Balwyn by the Camberwell City Council, and moved—"That this Club convey its hearty congratulations to the Camberwell City Council for having acquired Mr. Watson's Australian garden, adjoining Beckett Park, Balwyn, as a public reserve. The Club would express the hope that the collection of Australian trees and plants would be added to from time to time in order that visitors may become acquainted with the value of Australian vegetation for decorative purposes. The Club would also suggest that in any scheme of planting in Beckett Park only native trees and shrubs be used, in order that the area may be made a distinct attraction to visitors as a collection of entirely Australian plants."

The motion was seconded by Mr. H. B. Williamson and supported by Mr. F. Wisewould, and carried unanimously.

Mr. E. Cox recommended to the committee the purchase of a reading stand, which, he considered, would lead to a better delivery of the papers read before the Club. Mr. J. Gabriel said that he would be pleased to make and present a suitable stand to the Club.

Mr. A. D. Hardy referred to the fox question at Phillip Island, and said from what he could gather the recent fox drive had not achieved much success, owing to the great amount of cover;

many of the foxes seen had evaded their pursuers. During a recent visit he had seen dead Mutton-birds, not only on the hummocks, but some distance away, which indicated that they must be killed by foxes.

EXHIBITS.

By Mr. C. J. Gabriel.—Marine shells, *Murex palmarosæ*, Lam., and *M. tenuispina*, Lam., from Ceylon; *M. pinnatus*, Wood., from China; and *M. cervicornis*, Lam., from Northern Australia.

By Mr. A. D. Hardy, F.L.S., on behalf of Mr. W. J. Code.—Pair of ichneumon flies, *Myristica*, sp., taken on an Ironbark sapling in the Heathcote district. This is a useful forest insect which deposits its eggs in the destructive wood-boring larvæ of various beetles and moths.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD - FLOWERS.—The Field Naturalists' section of the Royal Society of South Australia purpose holding an exhibition of wild-flowers in Adelaide early in October, and will be glad of help from Victorian flower-lovers. The committee of the F.N.C. will be glad if some of its members will contribute to the Adelaide exhibition, and thus reciprocate for the help received here from that State. Mr. E. H. Ising, Institute Building, North-terrace, Adelaide, will be glad to furnish further details.

THE LATE MR. JOHN BOOTH, M.C.E., B.Sc.—We have to again mourn the loss of a member of the Field Naturalists' Club. On Sunday, 25th July, Mr. John Booth, M.C.E., B.Sc., was suddenly called to his long rest. Mr. Booth, though his tastes were inclined to microscopy, was a versatile scientist. He frequently attended meetings of the Club, and in May, 1919, contributed an extremely interesting paper on the ways, in captivity, of a Flying Phalanger. The paper was happily put together, and a model for other members. Several members of the Club and of the Microscopical Society were among the many friends present at the interment in Coburg Cemetery on Monday afternoon, the 26th ult.

The Victorian Naturalist.

VOL. XXXVII.—No. 5. SEPTEMBER 9, 1920.

No. 441.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 9th August, 1920.

The president, Mr. J. Gabriel, occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE.

From Mr. G. Coghill, intimating that a friend of the Club had offered a donation of £10, to be used in part payment of the expenses of char-a-banc outings. The committee having decided to accept the offer, it was resolved that the thanks of the Club be tendered to the unknown donor, through Mr. G. Coghill, for his very acceptable gift.

From Mr. A. G. Brown, on behalf of residents of the Noojee district, asking the Club's support in an effort to get an area of Mountain Ash country reserved from cutting as a typical sample of Victoria's forest resources.

It was pointed out that the area indicated had already been handed over to the War Service Homes Commission, but it was resolved, on the motion of Messrs. Daley and Harvey, that the Club is in sympathy with the movement, and will give every assistance towards getting such an area permanently reserved.

From Mr. W. Glance, resigning his office of assistant hon. secretary and librarian, owing to ill-health. Resolved that the resignation be accepted with regret, and that the thanks of the Club be tendered to Mr. Glance for his services during the past five years.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Harry Borch, 17 Tait-street, Newport, and Dr. George Horne, 63 Collins-street, Melbourne, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

At the invitation of the chairman, the members rose and stood in silence for a few moments as a mark of respect to the memory of their late fellow-member, Mr. John Booth, M.C.E., B.Sc., who had passed away since the last meeting of the Club.

A general discussion took place on the arrangements for the exhibition of wild-flowers in September. The chairman mentioned the difficulties which had beset the committee in endeavouring to secure a hall for the display. The only room available for the date fixed was the upper hall at the Melbourne

Town Hall, and this had been secured for Tuesday, 28th September. Though not quite so convenient as the main hall, he thought it would prove a satisfactory substitute. He asked members to urge their country friends to send representative collections, which should reach the hall early on the day appointed. It had been suggested that exhibits of other departments of natural history should be included, but, on the motion of Messrs. H. B. Williamson and C. French, jun., it was decided that the exhibits be confined to wild-flowers.

Mr. F. Pitcher suggested that at one of the monthly meetings during the winter there might be a general display of natural history specimens.

On the motion of Messrs. A. D. Hardy and H. B. Williamson, a hearty vote of thanks was accorded to the president for his gift of a handsome reading desk of his own construction.

PAPERS READ.

1. By Mr. G. A. Kcartland, entitled "Some Introduced Animals."

The author gave a number of interesting facts as the result of the introduction into Australia, and particularly Victoria, of animals which in their native land were not regarded as pests, whereas here they had not only become pests, but had cost the country millions of pounds, without any compensating advantages. He referred principally to rabbits, foxes, hares, cats, and deer, and remarked that this result was greatly due to the increased fecundity of the animals under notice in their southern habitat.

Several members took part in an interesting discussion on the paper.

2. By Mr. D. Best, entitled "To the Alps for Coleoptera."

The author gave some account of a collecting trip, mainly for beetles, to Mount St. Bernard and Harrietville in December last. He said that, though a number of interesting species had been secured, the results of the trip were not what he had anticipated—whether owing to a difference in the season or to the fact that numerous fires had taken place in the high ranges he could not say. However, he intended, all being well, to try the locality again during the coming summer.

REMARKS ON EXHIBITS.

Mr. H. B. Williamson called attention to a clock-case of polished sheoke made by Mr. G. A. Williamson, in which the grain of the wood was well brought out.

Mr. C. French, jun., drew attention to a number of species of Victorian scale insects, seven of which were new to science. Three of these had been collected by Mr. J. E. Dixon, and the rest by himself.

EXHIBITS.

By Mr. F. Cudmore.—Fragment of tusk of the American Mastodon (Late Tertiary formation), from Alaska, North America.

By Mr. C. French, jun.—Ten species of scale insects from the Mallee, Warburton, and Gembrook; life-history of Glass-wing Butterfly, *Acræa andromacha*, found breeding on passion fruit plants at Mysia, Northern Victoria (first record for Victoria); specimen of Chequered Swallow-tail Butterfly, *Papilio sthenelus*, taken on *Salvia* plants near Melbourne last summer (a rare butterfly in Victoria).

By Rev. A. J. Maher.—Specimens of orchid, *Pterostylis nutans*, Nodding Greenhood, from Wonthaggi.

By Mr. H. B. Williamson.—Clock-case made of Sheoke, Casuarina, sp., by Mr. G. A. Williamson.

After the usual conversazione the meeting terminated.

CORRECTION.—By an unfortunate slip the words "Craufurd" and "Munro" were transposed in the title of the plate in the August *Naturalist*. A corrected slip is forwarded herewith for attachment to the plate.

THE BLACK SNAIL.—At the January meeting of the Club (*Vict. Nat.*, xxxvi., p. 134) a question was asked regarding the nature of the food of the Black Snail, *Paryphanta atramentaria*. In a paper by Miss Olive Davies, M.Sc., which appeared in the *Proceedings of the Royal Society of Victoria* in 1913, an account is given of the anatomy of this snail and of the allied species, *P. compacta*, both of which are said to be carnivorous. Miss Davies says:—"The radula is large, as is usual in the carnivorous land mollusca." This radula, or lingual ribbon, measured in the specimen examined by Miss Davies about 20 x 5 mm., which is about five times the area of that of an ordinary slug or snail of equal size. Miss Davies found in the radula about 98 rows, each containing approximately 118 teeth. A specimen of similar size recently examined bore about 108 rows, each containing on an average over 150 teeth. The teeth are sharp spines, with an inferior enlargement to strengthen their adhesion to the radula, and are curved—those near the middle slightly, but the marginal ones much more so, as well as being shorter. The radula strikingly resembles that of *Testacella*, a European slug bearing a rudimentary shell, and which is said to live on earthworms. The disposition of the teeth, and their form, are almost identical, except that in *Testacella* the points are barbed. The oceanic snail, *Ianthina*, which feeds on *Acalephæ*, is said to have a radula of similar character.—W. M. BALE. Kew, 20th May, 1920.

PRESIDENTIAL ADDRESS.

[The following address was intended to have been delivered by the retiring president (Mr. A. D. Hardy, F.L.S.) at the fortieth annual meeting of the Club on 12th July last, but, owing to the lateness of the hour, had to be held over.—*Ed. Vict. Nat.*]

At a time when, evolving from the war, rapid improvements are taking place in locomotion generally by air, land, and water, and especially in aviation, the naturalist foresees a filling up of the blank places of zoogeographic and phytogeographic charts. The world, so far as the wide spaces are concerned, seems to shrink, and the reconnaissance survey of remote parts to give way to detailed examination of smaller areas. African, Australian, and other aerodromes become centres from which investigation of natural history phenomena go hand in hand with commercial adventure, as the flying man peers into recesses of the land and into depths of the sea hitherto undiscovered by the seeing eye, and one of the early results to be expected is the light that will be thrown on the mysteries of migration of birds and whales and other elusive fauna as the time-beaten tracks of these are intersected or followed by the new routes of human travel.

We have no fear of the lessening of the marine field, for, though the examination intensifies, the immensity is constant. Only parts of the fringing seas, where bay and estuary silts are polluted by river-borne or dredged sewage, become a source of anxiety—the matter being one of concern alike for the fishing industry, the naturalist, and the health officer; and to this extent only is the marine biologist troubled as to diminution of his hunting-ground.

Turning from the world at large to our own State of Victoria, we have the same shrinkage of the terrestrial field of nature study as the “squatters’ runs” (and with them the larger fauna) disappear. How many members of this Club have seen a flock of kangaroo, red or grey, in their wild state? I venture to say that, excepting the veteran members, very few can answer in the affirmative.

The impetus given to closer settlement in the process of repatriation of discharged soldiers means the breaking-up of large estates and the curtailment or abolition of harbours of refuge which, years ago, were ungrudgingly afforded by many of the large land-holders. Further, following the operations of the Country Roads Board and the Parliamentary Railways Standing Committee, better access is being given to the back country; and along these lines of communication, whether original or improved, settlement will proceed, and the existence

SIR RONALD CRAUFURD MUNRO FERGUSON, P.C., G.C.M.G.,
GOVERNOR-GENERAL OF AUSTRALIA.

HON. MEMBER FIELD NATURALISTS' CLUB OF VICTORIA.

of some rare species of plants and animals endangered. Incidentally, however, it follows that access to remote parts of the State will become easier for the naturalist, and the records of natural history pioneer work of such as Sir Ferdinand von Mueller* or Dr. George Neumayer † will in time read like romance.

While bay and estuary and lake remain, therefore, much as before—the silting up of the Gippsland Lakes being a very slow process—the river and creek of the uplands, the small billabong and anabranch of the plains or river flats, and all that is in them or in their immediate environment, may fare badly before many interesting problems have been solved. But at least there should be left to us the forest reserves; and this brings me to the part of my address on which I would place most emphasis.

The Victorian reserved forest area ‡ is about $4\frac{1}{8}$ million acres, or, roughly, about 6,500 square miles, equal to, approximately, one-thirteenth of the total area of the State—little enough when compared with that of many other countries. In this wealth of woodlands even the chief of the many commercial assets is not fully understood, for the eucalypts (to say nothing of their associates), whether in respect of their morphology, physiology, ecology, or economics, have not yielded all their secrets. With $4\frac{1}{8}$ million acres of land reserved we may feel fairly safe against settlement (the area of forest land that can be practically settled under provisions of the *Discharged Soldiers Settlement Act* being negligible), but drought and fire and the exigencies of timber famine have to be reckoned with, as well as destruction by animals and by vegetable parasites, &c. And this is where the Club's future usefulness might be manifested.

First as to collective and individual responsibility. In order to be a custodian of the forests it is not necessary to have a "gazetted" appointment. Are we not too prone to think of the ownership of the forests with an air of detachment, as affecting the property of the *Government*? The forests are the property of the people. Every member of this Club is part owner, with, presumably, an intelligent interest in his property, or at least with a desire to know and appreciate it. They are not a speculative concern. We cannot sell our shares; our liability is unlimited. Part of our income tax is money invested in this property, which we are bound to guard, cherish, and improve with as much zest as though it were a sheep farm, a factory, or a dwelling-house. Now, all the zeal and expert scientific treatment which we may have at our command in the directorate are of little effect unless backed

* *Vide* Barnard, *Vict. Nat.*, xxi., p. 17.

† *Vide* Barnard, *Vict. Nat.*, xxxiv., p. 185.

‡ *Vide* Hardy, "Forests of Victoria," *Vict. Nat.*, xxxii., pp. 69, 110.

by the sympathy and encouragement of the shareholding community; and I am out to impress each member with the sense of his own responsibility. What property owner, other than he who owns forest reserves, would stand idly by and see his belongings damaged or deteriorated? Until the time arrives at which the would-be incendiary, timber-thief, or grass-thief shall see in every approaching stranger, be he an official or a private citizen, a part owner of the property on which the intending malefactor has designs, this widespread forest wealth—necessarily impossible of complete or effective patrol—will suffer severely. Persistent checking of the offence in its attempt and the reporting of offences to the authorities become on the part of every citizen a duty, not only to the State, but to himself. There must come a time when the malefactor, starting already at shadows, shall find those shadows materializing, and in every footfall sense a source of danger to his selfish welfare. And in this proposed voluntary and honorary policing of the forests this Club, as a participant, should have many allies, for the forest has, fortunately, many aspects, as it should have many friends. It does not consist of timber trees and scrub only, though much of what we read might cause one to think so. The multiplicity of interests and the many minor industries, such as honey, oil, fibre, charcoal, fodder, tannin, and other chemicals, continue to increase, so that the awakening interest of the community is one of the best signs of the times. Our nearest and most potent allies should be the Ornithological Union, the Forest League, the Royal Society, the Town Planning Association, and the Horticultural Societies; but there are also artists and photographers and others with sentimental interests, besides the departments and societies with business interests in forest preservation, such as the Railways Tourists' Bureau, the State Rivers and Water Supply Commission, and the Apiarists' Association. It may be regarded as a foregone conclusion that practical help from all of these combined or from a group; or, indeed, from any one of them, would be appreciated and welcomed by the Government.

The rehabilitation of the forest area has all the world over become a serious problem. In Europe the military destruction of forests has been enormous. Europe is looking to North America for supplies from the supposedly unlimited resources of that country. But usage and waste in the United States and Canada before and during the war were together greater than replacement by artificial means and natural regeneration, and there have been strong protests against further exportation in view of home requirements. Importations from the United States and Scandinavia will never again be what they were, owing to our own planting of coniferous woods and our present scheme of conservation of the hardwood forests now being put

into effect by the Forests Commission. But the strain on the hardwood forests of Victoria is severe, and must continue so for a generation. Thus the care of our indigenous forests is a matter of paramount interest for this Club, and I venture to suggest lines of future work in this connection. Could we not form groups for the purpose of forest investigation? One group might attack the important work of forest entomology, another forest ornithology, while the forest fungi and vegetable parasites and forest weeds could each absorb the activities of a group. There is also much to be done in ecological work and other sections of forestry. Those whose business it is to exploit the forests (*e.g.*, sawmillers and timber merchants) take no initiative in these matters, but rely on *the Government*. The Government does not rely on us, but, unable itself to do everything that requires doing, might confidently be expected to assist in various ways work of a useful nature once begun and of fair promise.

There is another field of work in danger of serious reduction, and affects the microscopists. This comprises the still waters near the city, wherein there is still abundance of unknown or little known life of either animal or vegetable nature. Many groups require working, and the few groups being worked require more students. The requisition is urgent, as the small ponds and marshes are disappearing in the outer suburban land reclamation and improvement. When it is remembered how easily microscopic forms of life, especially in spore form, are transferred by aquatic birds, &c., from pool to pool, and that the bird now swimming or wading in a near-by marsh may later be delightedly splashing in a distant reservoir of our water supply, the economic as well as scientific interest of such study as this field affords must be at once obvious, and the benefit in getting these microscopic organisms collected, examined, described, and recorded must be apparent.

Finally, without wishing to exhaust the whole scheme of the Club's existing or future activities, I would say a few words as affecting the need of preservation of some types of animal and plant associations, some of them within easy reach of Melbourne, and others remote. There should be acquired, within the limits of an afternoon's excursion from the city, a coastal tea-tree area (the *Leptospermum* of the botanist), which should be available for botanical investigation only and reserved permanently for future generations of botanical students. The ordinary holiday camper, the vandal, and hoodlum would not gain access except as trespassers if permits were issued through secondary schools and scientific societies. Similarly, an area of Sandringham flora should be reserved, fenced, and protected by fire-breaks. Further afield, an urgent need of the ornithologist would be met by the permanent

reservation in the Mallee district of several areas as sanctuaries for those interesting forms of bird-life which, peculiar to the region, could not be acclimatized in the National Park at Wilson's Promontory.

SCIENCE AT GOVERNMENT HOUSE.

IN view of his early departure from Australia, His Excellency the Governor-General, Sir Ronald Munro Ferguson, G.C.M.G., kindly invited some twenty-five prominent members of various scientific societies and kindred associations of Melbourne to afternoon tea at Government House on Saturday, 24th July. In the course of an informal chat Sir Ronald expressed the opinion that there should be a closer union of the scientific societies of the various States, and that there might be a council of representatives of such societies qualified to deal promptly, in case of need, with questions of general interest which might arise from time to time.

His Excellency said that he regretted that the time had come when he must sever the interests which had grown up during his residence in Australia, and which would be long remembered by him. He had been greatly interested in Australian forestry, and, the conditions here being so different to those of the homeland, he could not claim to be more than a learner; but on his return to Scotland he would again become a practical forester and do his utmost to promote the cultivation of trees.

Before leaving for Sydney and Brisbane His Excellency forwarded the following message to the Field Naturalists' Club:—

"One of my regrets on leaving Melbourne is that I have not had time to go on more excursions with the Victorian Naturalists' Society. I saw enough of the society, however, to apprehend the good fellowship, love of country, knowledge of nature, that is engendered by its discussions and peregrinations. Its membership cannot be too numerous.

"The close association of the Field Naturalists' Club with the Royal, the Forest League, and other learned societies is the surest guarantee for that awakening of public attention to the need to conserve national pleasure grounds and to protect our forests from fire. It aids also in cultivating that taste for geology and physical geography which adds so greatly to the joy and interest of life.

"The society is in good hands, and I wish it, with all my heart, all the support and consideration which it has earned, and the prosperous future which is its due.

"R. M. FERGUSON.

"Government House, 12th August, 1920."

THROUGH THE MURRA MURRA COUNTRY (WESTERN GRAMPIANS).*

By J. W. AUDAS, F.L.S., F.R.M.S., National Herbarium,
Melbourne.

(*Read before the Field Naturalists' Club of Victoria, 8th March, 1920.*)

DURING the past nine years my friend, Mr. C. W. D'Alton, and myself have at various intervals spent many happy weeks together exploring the Victorian Grampians, examining known localities and discovering unexamined ones, until no portion of that immense region remained to be investigated but the isolated and rarely traversed part which has been retained as a timber reserve by the Victorian Government, and is known as the Murra Murra State Forest. We had long dreamed and planned this trip, which would necessitate the use of mountain ponies, sturdy and sure-footed, camping outfit, and much strenuous climbing on our own part. In October last these hopes were realized. We were fortunate in securing horses that could be relied upon for the work, and we left "Kia-Ora," Mr. D'Alton's residence at Hall's Gap, early on the morning of Saturday, 11th October, and started along the jinker track up the Stony Creek valley.

As the sun rose, terraced ridges of distant hills showed dimly through a purple haze. The clear early morning air on the mountains was exhilarating, and the scent of the eucalypts (so strong before the dew has lifted) was delightful. For about two miles we had easy travelling, but when we turned on to the bridle path to the Victoria Valley the ascent became very steep—so much so, indeed, that we were frequently forced to dismount and lead our horses over some of the roughest pinches. The scenery now was magnificent. The track we were following has been cut on the side of that appropriately-named peak Mount Difficult, which towered in its rugged grandeur above us, and in the dizzy distance of valleys hundreds of feet below Stony Creek wound like a silver ribbon. Beyond showed the western slopes of Mackey's Peak, rising a thousand feet or more. Its great side consists almost entirely of one huge sheet of rough scarified rock, and looks like the hide of some huge animal stretched out to dry, and on this account is called by many people "The Elephant's Skin."

After passing the beautiful Venus Bath and the Splitters' Fall, we struck the bridle track which leads over a saddle in the range between Mounts Rosea and Difficult. From this

* Previous papers by Mr. Audas are:—"One of Nature's Wonderlands—the Victorian Grampians," *Vict. Nat.*, February, 1913 (xxix., p. 146); "The Grampians Revisited," *Vict. Nat.*, June, 1914 (xxxi., p. 24); "Nature in the Serra Range," *Vict. Nat.*, April, 1919 (xxxv., p. 171).

dividing ridge a wonderful panorama of the Victoria Valley could be seen. Here the track throws off a branch to the right leading to Wartook Valley and the M'Kenzie Fall, but we continued straight ahead. Descending the ranges of this unfrequented part, native fauna were particularly numerous, undisturbed, and happy in their mountain homes. We came suddenly upon an old Emu and a large clutch of chickens feeding with great relish on the berries of the Flame Heath, *Astroloma conostephioides*. Quickly, on the approach of danger, the mother bird gave a loud warning call, and it was interesting to see the chicks immediately scatter in all directions and hide quickly in the undergrowth. Flocks of gaudy parrots, diverse and many-coloured in plumage, screamed noisily about us, quite eclipsing the glory of "Little Robin Redbreast," who hopped from twig to twig in his bright red waistcoat. High above, from the branches of a bare, dead tree, came the greeting of the wise Australian, "Mr. Kookaburra," who is loved by all, in spite of his scornful laughter.

Though we made one more steep ascent, we were really gradually descending, and the vegetation at the various altitudes became interesting. Here we came upon several nice patches of that handsome shrub with tubular red flowers, *Brachyloma ericoides*, and the pretty Love Creeper, *Comesperma volubile*; the latter, covering bushes with sky-blue and purple flowers, gave a charming effect. Further down the slopes were great clumps of Golden Heath, *Styphelia adscendens*, and Mountain Grevillea, *G. alpina*, both of which had here adopted a trailing form, some clusters being several yards in circumference. Proceeding, we noticed on either side of the track full blooming specimens of *Phebalium bilobum*, *Melaleuca squamea*, *Hakea rostrata*, *Pimelea linifolia*, *Calythrix tetragona*, *Grevillea oleoides*, *Grevillea rosmarinifolia*, *G. parviflora*, *Stackhousia viminea*, *Correa æmula*, *C. Lawrenciana*, *Boronia pilosa*, *Pseudanthus ovalifolius*, and the handsome Blue Tinsel Lily, *Calceolaria cyanea*. Further along, on the moist ground near a creek, were some fine bushes of Showy Bauera, *B. sessiliflora*, some having flower-spikes quite three feet in length. Leguminous plants were just coming into flower, and a week later would be golden with blossoms. The most advanced among them were *Pullenaea rosea*, *P. Benthami*, *P. mollis*, *P. villosa*, *P. scabra*, *Daviesia corymbosa*, *Bossia riparia*, *B. cinerea*, *Dillwynia ericifolia*, and *D. floribunda*—the two latter attaining the unusual height of seven feet.

While now descending, we were flanked on our left by the great surface of the mountain which is known as the western wall, and the rock scenery was magnificent indeed. When crossing a fertile tea-tree flat we were surprised to find the

Yellow Hakea, *H. nodosa*, growing to the height of twelve feet, for it is usually a dwarf shrub of three or four feet. The Tassel Cord Rush, *Restio tetraphyllus*, abounded here on swampy ground. This restiaceous plant is very ornamental, and would make a splendid border plant for edging lagoons in parks and gardens. It grows to about six feet, and is crowned by handsome clusters of brown-tinted flower-heads. On the level country next traversed we passed fine groves of the wattles *Acacia mollissima* and *A. dealbata*. In the grassy glades between we disturbed mobs of large Forester Kangaroos and flocks of Emus. Our dog also created chaos among some fat and contented wild pigs which were vigorously uprooting the bracken fern, and they rushed off through the scrub with much indignant snorting and grunting. Following along one of the many fire-breaks which have been cut through the forest at intervals to check the ravages of bush-fires, we observed the tracks of a couple of deer, which we followed for some distance, but failed to catch a glimpse of the animals.

Continuing, we passed through some fine red gum country, consisting largely of young growing timber, while in some cases the older trees had attained huge dimensions. We noted particularly one, inside the hollow of which several men could camp comfortably. Further on we passed through some fine yellow box country, in which locality there are several fine large apiaries. Both yellow box and red gum are splendid honey-producing trees, and a large quantity of this useful commodity is sent from this district to the Melbourne market. Deviating from the main track at this point, we traversed what is known as Mount Victory Range (recently so named in commemoration of the termination of the great European war), and from this vantage-point a fine view is obtained. To the north one looks down upon Lake Wartook, nestling picturesquely among the shade of surrounding hills, while to the south lies the Victoria Valley, walled on the one hand by the great mountains of the Victoria Range, with the head waters of the Glenelg River creeping around its base, and on the other by the Serra Range, stretching in numerous peaks, tier upon tier, to its termination in Mount Abrupt, near Dunkeld, just discernible in the distance. After resting and spending some time in examining this locality and feasting on the glorious views stretching in all directions from this point, we once more began our descent into the great solitary regions known as the Murra Murra and Victoria Valley.

Game became plentiful when we reached the lagoons and swamps in more level country, and Black Duck, Teal, and Black Swans rose in great numbers as we disturbed them from their feeding-grounds. It was late in the evening before we struck

the main road which runs from Horsham through the mountains to Dunkeld, and here we found ourselves in a dilemma, for neither of us was sure which direction led to the forest lodge, where the forest ranger resides, and where we had been kindly advised by Mr. Mackay, the Conservator of Forests, we could secure shelter for ourselves and our horses for the night. After some deliberation, lured by a telephone wire, we decided to go south, and, following the road for some miles, came to the home of a beekeeper, where we learned that we had chosen exactly the wrong direction. As the black darkness of the forest had now set in, he kindly offered us shelter for the night, which we gladly accepted. Both ourselves and our horses were tired from the long journey, having covered over twenty-five miles of difficult mountain country in the day. After enjoying a hearty meal with our host, we sat on a big gum log smoking and yarning till the light of the moon stole softly out, turning the leaves of the forest into millions of shining silver shillings, and shy little opossums could be seen moving from bough to bough, and the quick draught of squirrels gambolling overhead could be felt. Native bears or koalas were abroad, and the sad, plaintive note of the Curlew sounded in the distance. These and a hundred other sounds in the still hush of the forest night were as an open book to our host, who read to us therefrom many tales of bush life, and we spent an enjoyable time listening to his reminiscences.

In the morning we were up at daylight, and after a hurried breakfast bade farewell to our host and started off through the red gum forest in the direction of Victoria Range, which we reached about noon. Here we had our mid-day meal on the banks of the Glenelg River. Part of the afternoon was given up to examining the flora of the range, but it proved rather disappointing, as flowers did not appear to be nearly so numerous as on the eastern side of the valley—viz., the Serra and Mount Difficult Ranges. The only plants worthy of note not previously collected by us were:—*Eucalyptus dives*, *Hibbertia humifusa*, *Spharolobium daviesioides*, *Phyllota pleurandroides*, *Templetonia Muelleri*, *Cryptandra amara*, *C. tomentosa*, *Choretrum glomeratum*, *Pleurandropis phebaloides*, *Gompholobium minus*, *Lagenophora emphysopus*, *Opercularia scabrida*, *Elynanthus capillaris*, *Lepidobolus drapetocolus*, *Brachycome goniocarpa*, *Selaginella Preissiana*, *Carex breviculmis*, and *Polygonum lapathifolium*. We therefore decided to follow the valley in a southerly direction, and rode for twelve miles through one continuous stretch of fine red gum forest, *Eucalyptus rostrata*, which is being most carefully conserved by the State Forests Department, portion being fenced and protected from rabbits, for these mischievous little animals, in spite of the destruction

wrought upon them, seem to be still very numerous in this locality. Passing through part of the range known as Green's Gap, flowers again became numerous, and a most charming picture was produced by the golden blooms of *Pultenaea mollis*, the red of *Dillwynia hispida*, and the white and blue of *Calytrix Sullivani* and *Stypanandra glauca*. Blending in perfect harmony, they showed up beautifully against the dull-coloured sandstone rocks around. Darkness was descending, with the thick, impenetrable blackness of the bush, and we had just time to cross the saddle track and strike the head waters of the Wannon River. The banks of this stream are covered with great quantities of Coral Fern, *Gleichenia dicarpa*, on which we spread our blankets and slept comfortably for the night.

Dawn revealed to us that we had camped in a lovely and secluded spot, far from the haunts of man, where beautiful, untarnished nature reigned supreme. This valley is a continuation of Hall's Gap, and only about a mile in width. The Mount William Range towers up on one side, while the Serra Range almost overshadows the other. Here, near its source, the Wannon is practically a creek, flowing silently through a great natural forest, almost smothered from sight at times by masses of Coral Fern, *Gleichenia dicarpa*, Umbrella Fern, *G. flabellata*, Snow Myrtle, *Lhotzkya genetylloides*, Fringed Heath-Myrtle, *Micromyrtus microphylla*, Showy Bauera, *B. sessiliflora*, Soft Bush-Pea, *Pultenaea mollis*, and Mountain Club Moss, *Lycopodium densum*.

Along the Wannon Gorge, near the foot of Mount William, some fine specimens of King Fern, *Todea barbara*, and Soft Tree-Fern, *Dicksonia antarctica*, were met with, also the following, not previously collected by us, viz.:—*Boronia parviflora*, *Dampiera lanceolata*, *Dodonaea procumbens*, *Lepyrodia scariosa*, *Centrolepis glabra*, *Oreomyrrhis andicola*, *Hydrocotyle medicagnoides*, *Myriophyllum integrifolium*, *Juncus capitatus*, *Lepidospora tenuissima*, *Scirpus fluitans*, *Chorizandra enodis*, *Epacris lanuginosa*, *Carex breviculmis*, *Cladium articulatum*, *C. schænoides*, *C. Gunnii*, *Lepidosperma carphoides*, *Schizæa fistulosa*, *Stipa Muelleri*, and *Asplenium præmorsum*. Proceeding homeward, we rode through a fine forest of stringybark and messmate timber which sawmillers had not apparently touched for twenty years. At one spot there is the site of an old sawmill which had apparently been destroyed by bush-fires, as the remains of engine, &c., are still lying about among the long grass. This locality is known as "Burnt Boiler" by stockmen and rare tourists who occasionally pass that way. Near by is a large morass known as the "Upper Swamp"; it is situated just over the saddle which divides the waters of the Wannon, flowing south to the

sea, from those of Fyans Creek, running north to the Wimmera River. Looking across this morass, which is several miles wide, one obtains a fine view of a part of the Serra Range where a score of unnamed peaks stretch away in the distance like sentinels guarding the valley below. Far away in the distance one can just distinguish Mount Rosea, which is the northern extremity of this fine range. The swamp at our feet, and all the open patches about, are thickly studded with large tufts of grass-like Cyperaceæ and Liliaceæ, the most common being the Button Bog-Rush, *Gymnoschoenus adestus*, which grows in large tufts five feet high, with dense, globular flower-heads about an inch in diameter. Of the Liliaceæ, the most prevalent is the Small Grass-tree, *Xanthorrhœa minor*, and Long Matrush, *Lomandra longifolia*. Among their tufts some grasses find a precarious domicile, the most adventurous of these being the Long Hair Plume-grass, *Dichelachne crinita*, Wallaby Grass, *Danthonia penicillata*, Nigger Head, *Pappophorum nigricans*, Corkscrew Grass, *Stipa setacea*, Fibrous Spear Grass, *Stipa semibarbata*, Common Wheat Grass, *Agropyron scabrum*, Grey Beard Grass, *Amphipogon strictus*, and Foxtail Mulga Grass, *Neurachne alopecuroides*. The more open grass-lands were gay with a thousand flowers of Compositæ, Goodeniaceæ, and Dilleniaceæ, most striking among them being the white of *Helichrysium Baxteri*, the pink of *Scævola æmula*, and the yellow of *Hibbertia densiflora* and *H. stricta*.

For the next seven miles the country is uninteresting. Manuka, *Leptospermum scoparium*, forms dense and extensive scrubs which are absolutely impenetrable, and our only means of progress was by following the paths made by native animals, such as kangaroo and wallaby, on their way to water. After crossing the saddle and striking the head waters of Fyans Creek the country changes, and for miles is splendidly timbered, showing also a great wealth and variety of native shrubs and flowering plants. The whole countryside was practically ablaze with the beautiful blooms of the Common Heath, *Epacris impressa*, in shades varying from deepest red to the whiteness of snow. Near the weir on Fyans Creek, where the take-off for the Stawell water supply is situated, we struck the Borough Hut Settlement, and were relieved to find ourselves back amongst civilization once again, for, though solitude and grandeur of scenery are indeed fine, one longs for one's fellow-creatures. Detouring from the main road, we passed along a bridle track near where the Stawell water supply passes through the mountain by means of a tunnel three-quarters of a mile long, and inspected the Pomonal orchards, which are situated on the eastern slopes of Mount William Range. Here great quantities of splendid fruit are grown, mostly apples for

exportation to the European markets, about a thousand tons being sent away annually. From Pomonal we followed the Mount William Range to its termination at the head of Hall's Gap. Passing through the "Wild Flower Garden of the Grampians," which was in glorious bloom at the time, we noted the following shrubs in full flower, viz.:—Crimson Kunzea, *K. parvifolia*, Olive Grevillea, *G. oleoides*, Prickly Grevillea, *G. aquifolium*, Beaked Hakea, *H. rostrata*, Mountain Conosperm, *Conospermum Mitchellii*, Rough Mint Bush, *Prostanthera denticulata*, Leafless Bitter Pea, *Daviesia brevifolia*, Pale Wedge Pea, *Gompholobium Huegelii*, Bushy Heath-Myrtle, *Thryptomene Mitchelliana*, Daphne Heath, *Brachyloma daphnoides*, Rough Aster, *Olearia asterotricha*, Star Hair, *Astrotricha ledifolia*, Purple Eyebright, *Euphrasia Collina*, Ploughshare Acacia, *A. vomeriformis*, Small Leaf Pomaderris, *P. elachophylla*, Grooved Dampiera, *D. lanceolata*, and Pinnate Boronia, *B. pinnata*.

We arrived back at Mr. D'Alton's residence in time for the evening meal, feeling tired, but otherwise greatly satisfied with our trip, which, both from a botanic and scenic point of view, was delightful. During the three days we had traversed an area of about 120,000 acres, and with this trip may be said to have completed our survey of the entire Grampians area, which covers about 450 square miles. The number of flowering plants and ferns previously collected by Messrs. Sullivan, Walter, Williamson, Campbell, and others amounts to 686; our additions bring the total up to 737 species.

THE "GARDENING BULLETIN."—There are probably few field naturalists who are not also garden-lovers. For those who wish to be up to date in gardening matters, the *Gardening Bulletin*, published monthly by E. and W. Hackett, nurserymen, of 73 Rundle-street, Adelaide, will be found an excellent help and guide. The September number commences the fourth volume, and for a subscription of 3s. 6d. it will be posted regularly to any address. The articles are always crisp and bright and of great value.

THE "QUEENSLAND NATURALIST."—We welcome the re-appearance of the *Queensland Naturalist*, the organ of the Queensland Field Naturalists' Club, after a suspension of nearly three years, owing to insurmountable causes. The Club is to be congratulated on its effort to keep going, and from the quality of the articles in the number to hand should have a bright future before it. "The Story of a Little Fly," by Mr. W. R. College, is a most interesting contribution, and just the kind of article which is appreciated by lovers of nature.

THE "SOUTH AUSTRALIAN NATURALIST." — The August number of this publication concludes the first volume of our contemporary, and we wish it a long life. In a short article by Mr. E. H. Ising on "Orchids Growing from Seeds," it is pointed out that our native orchids must sometimes grow from seeds instead of by the increase of the tubers, as is usually stated. He gives as an instance the railway embankments between Eden and Blackwood, in the Mount Lofty foothills, where two or three species of *Diuris* are fairly plentiful. It is pointed out that these embankments were made some thirty or forty years ago, and it is hardly likely that the tubers were moved with the soil, but rather that they are the result of seed distribution. The exhibition of wild-flowers by the members of the Adelaide society will be held on 8th and 9th October, and help from Victorian residents will be greatly appreciated.

FLINDERS CHASE, KANGAROO ISLAND, S.A.—The full story of the efforts, extending over eighteen years, made by South Australian nature-lovers to secure a reasonable area on Kangaroo Island as a fauna and flora reserve is told by Mr. Samuel Dixon, who was for twenty-three years chairman of the Fauna and Flora Protection Committee of the Field Naturalists' Section of the Royal Society of South Australia, in an illustrated booklet recently published in Adelaide. The author points out that, had the representations made to the Government been listened to and acted on at the outset, the soft-wood production (pines) of the island would now amount to thousands of pounds' worth annually, while skins of native animals to the value of at least £25,000 had been lost to commerce. In acknowledging the receipt of a copy of the publication, His Excellency the Governor-General wrote congratulating the author on the success of the effort in connection with the formation of the Kangaroo Island reserve, and said that if the Field Naturalists' Societies, Forest Leagues, Royal and other kindred societies were to affiliate more closely within each State, and such affiliations linked up with similar ones in other States, forestry might be greatly helped. It is to be hoped that the Board appointed to administer the 1,000 acres set aside will not be hampered by want of funds, and that Flinders Chase will in due time become a holiday and health resort where, as at Wilson's Promontory National Park, visitors can get into close touch with representatives of Australia's unique fauna and flora.

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No. 442.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 13th September, 1920.

The president, Mr. J. Gabriel, occupied the chair, and about 40 members and visitors were present.

CORRESPONDENCE.

From His Excellency the Lieutenant-Governor, Sir William J. Irvine, intimating that he would have very much pleasure in opening the Club's exhibition of Australian wild-flowers on 28th September, at 4 p.m. The hon. secretary stated that he had acknowledged this letter with thanks, and had written that the Club extended a hearty invitation to Lady Irvine to be present at the display.

From Mr. R. W. Smellie, Town Clerk of Camberwell, thanking the Club for its appreciative remarks in regard to the Council's acquirement of Mr. J. M. Watson's garden adjoining Beckett Park, Balwyn, and pointing out that the Council does not acquire possession of the garden during the lifetime of Mr. Watson, but that when possession is taken it is intended to continue it on the same lines as at present.

From Mr. F. Lewis, Acting Chief Inspector of Fisheries and Game, in reply to the Club's protest against allowing any collecting for trading purposes of eggs of protected Victorian birds, and that the collecting of such eggs for such purposes should be absolutely prohibited. The reply stated that the word "discountenanced" would express better than the word "discouraged" the writer's intention, and that what was meant was that persons who wished to collect eggs with the idea of making money out of the business by selling them to other countries would not be granted permits, but only those persons who were genuinely working for scientific purposes.

On the motion of Messrs. Barnard and Williamson it was agreed that a reply be sent thanking the Inspector for the satisfactory decision in the matter.

From the hon. secretary Stawell Horticultural Society, agreeing to help in having wild-flowers collected and forwarded to the forthcoming exhibition.

From the hon. secretary Canterbury Horticultural Society, inviting the Club members to join with the society in its visit to Mr. J. M. Watson's wild-flower garden, Beckett Park, Balwyn, on Saturday, 18th September.

REPORTS.

A report of the excursion to Diamond Creek on Saturday, 14th August, was forwarded by the leader, Mr. J. W. Audas, F.L.S., who reported a good attendance of members. The Silver Wattles were found to be in the height of their blooming, and were a beautiful sight. About a dozen species of eucalypts were noted during the afternoon, while there was a fair variety of early spring flowers.

A report of the excursion to Black Rock on Saturday, 28th August, was given by the leader, Dr. C. S. Sutton, who reported a good attendance of members and an interesting afternoon, and, though a fair number of flowers were collected, there was nothing of special note among the species noted.

A report of the excursion to Boronia, on Saturday, 4th September, was given by the leader, Mr. F. G. A. Barnard, who stated that there had been a good attendance of members, and, favoured by a fine afternoon, an interesting ramble had resulted. The Acacias *A. myrtifolia* and *A. leprosa* were found to be at their best, and made a fine display, as also did *Kennedya monophylla* in several places. Perhaps the most noticeable feature of the afternoon was the sight of a large area of daffodils, grown for market purposes, in full bloom, also quantities of *Boronia megastigma*.

A brief report of the excursion to Bendigo on Saturday, 11th September, was, on behalf of the leader (Mr. D. J. Paton, of Bendigo), given by Mr. C. Daley, F.L.S., who said that a visit had been paid to the Whipstick Scrub, to the north-west of Bendigo, and an interesting collection of wild-flowers made.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Frederick Shaw, "The Rest," Nelson-street, Abbotsford, was duly elected as an ordinary member, and Mr. Stanley J. Walker, 517 Sydney-road, Parkville, as an associate member of the Club.

ELECTION OF ASSISTANT SECRETARY.

Mr. Charles Oke, being the only member nominated for the position of hon. assistant secretary and librarian, was declared duly elected.

GENERAL BUSINESS.

Mr. E. Cox mentioned that he had been in communication with the Geelong Fish Acclimatizing Society re a visit to its hatchery. The society had informed him that no stripping was now done at Geelong, but that ova was procured from Tasmania and New Zealand. Stripping is, however, done at Ballarat from trout from Lake Wendouree in the month of June each year.

The president thought it would be as well for Mr. Cox to

keep in mind the possibility of a visit to the Ballarat hatchery next year.

On the motion of Mr. C. French, jun., and Dr. Sutton, the hearty congratulations of the Club were tendered to Mr. F. G. A. Barnard (hon. editor) on his election as Mayor of Kew. Mr. Barnard, in acknowledging the resolution, said that he was not the first member of the Club to attain the position of mayor, as Mr. E. H. Kinnear had just completed his term of office as mayor of the city of Essendon.

Mr. J. A. Kershaw, F.E.S., brought forward the question of the retention of Lake Hattah, in the Mallee, as a bird sanctuary, stating that there was a local movement to have this sanctuary abolished, on the ground that it is not a breeding-place. He said that on the lake the birds were safe from molestation, and it would be a great pity if it were thrown open to sportsmen. The Ornithologists' Union had already sent in a protest.

Mr. F. Wilson said that, although ducks did not breed there, other water-fowl did.

Mr. Barnard moved that a protest against the abolition of the sanctuary at Lake Hattah be forwarded to the Minister. He mentioned that the late Mr. O'Donohue had several times mentioned Lake Hattah and the adjacent lakes in papers descriptive of that portion of the Mallee.

Mr. H. B. Williamson, in seconding the motion, gave an interesting account of a visit to the lake some time ago.

The motion was carried unanimously.

REMARKS ON EXHIBITS.

Mr. Alfred Tadgell stated that he had gathered the Blue Fairy Orchid, *Caladenia deformis*, for many years without any variation in colour, but this year he had found specimens of a white colour with pink labellum, and also a yellow variety which was unknown either to Mr. French, jun., Mr. Pescott, or Dr. Rogers, of Adelaide.

Mr. Chas. Daley drew attention to his exhibit of flowers procured on the Bendigo excursion.

PAPER READ.

By Mr. J. C. Goudie, entitled "Three Anglers at the Murray."

The author described the incidents of a trip from Sea Lake to the Murray, in the vicinity of Nyah, some twenty miles below Swan Hill. He also gave some account of the ornithology of the district, and of the results of the fishing, which were very satisfactory.

In the discussion that followed Mr. E. Cox stated that big fish could be caught in the Murray in the day-time on hand lines, and mentioned an 82-lb. Murray Cod that had been caught on a spinner.

NATURAL HISTORY NOTES.

Mr. J. Gabriel reminded members of a natural history note he had related some time ago, in which he told of the efforts of a pair of swallows to build on top of a tennis ball placed in their nest. These swallows were now attempting to build in the same place. Though the nest has been pulled down each night during the past fortnight, the birds are now trying to reinforce the mud with fibres.

Mr. F. Wilson stated that during the past winter he had noticed forty or fifty swallows settling for the night on an electric light wire under a verandah, those on the end striving to displace those nearer the middle, evidently to get a warmer position, until they finally settled for the night. Now that the spring had come the birds are pairing off, so that at present only a few roost on the wire.

EXHIBITS.

By Mr. F. G. A. Barnard.—Flame Pea, *Chorizema cordatum*, grown at "Rockingham," Kew.

By Mr. Charles Daley, M.A.—Scrub flora from Whipstick Scrub, Bendigo, including :—*Eriostemon obovalis*, *E. difformis*, *Crowea exalata*, *Boronia anemonifolia*, *Cryptandra amara*, *Dodonaea viscosa*, *Grevillea rosmarinifolia*, *Dampiera marifolia*, *Acacia calamifolia*, *A. glandulicarpa*, *Claytonia pygmea*, *Marianthus procumbens*, *Hybanthus floribundus*, *Eucalyptus viridis*, *E. polybractea*, *E. incrassata*, *E. Behriana*, *Cassythia melantha* (on *Eucalyptus viridis*), and *Daviesia genistifolia*, collected during the excursion to Bendigo on Saturday, 11th September.

By Mr. W. H. Ingram.—(a) Water-stone from Beechworth, Victoria (this is a crystalline form of silica, containing liquid); (b) wings of Argus Pheasant, from Malay States.

By Mr. Alfred J. Tadgell.—Dwarf Squill, *Chamaescilla corymbosa*, in three colours—blue, pale blue, and white—from near Cheltenham, Victoria; the Blue Fairy Orchid, *Caladenia deformis*, normal blue, also pink, from near Cheltenham, Victoria. A rarer variety—yellow—was also found in the same locality, which it is hoped will be exhibited at next meeting.

By Mr. L. Thorn.—(a) Mistletoe Blue Butterfly, *Ogyris olane*—larvæ, pupæ, and perfect insects of both sexes. The larvæ are night feeders, hiding under loose bark during the day. Sometimes they have to travel a long distance to reach their food-plant. The exhibitor has taken the larvæ in various stages near the base of the tree, with the mistletoe (their food-plant) ten to fifteen feet higher up. (b) Ten species of Victorian moths and twelve species of Victorian butterflies, both sexes of each species, and the pupa cases from which the perfect insects emerged.

After the usual conversazione the meeting terminated.

THE FIELD NATURALISTS' CLUB OF VICTORIA,
1905-20: A RETROSPECT.

BY F. G. A. BARNARD.

(Read before the Field Naturalists' Club of Victoria, 10th May, 1920.)

FIFTEEN years ago, as the subject of a presidential address, I had the pleasure of giving a brief history of the founding of our Club, and its doings during the first twenty-five years of its existence; and, though it might have been more in the usual order of things to have deferred making further reference to its history until it attained its jubilee in May, 1930, I felt that ten years at my time of life was too great a space of time to look forward to; and as I wished to bring the history up to date, I propose to take advantage of to-night being the fortieth anniversary of its foundation to give you some brief notes of the doings of the last fifteen years.

The address referred to will be found in the *Naturalist* for July, 1906 (*V.N.*, xxiii., p. 65), and I will continue on the same lines, simply giving the names of the president and hon. secretary for each year, and notes of any important happenings. It may be noted that, excepting for 1919-20, Mr. G. Coghill was hon. treasurer for the whole of the period.

I will conclude with a summary of results so far as they can be shown by figures, and will leave you to judge whether the Club has justified its existence.

1905-6.—Mr. F. G. A. Barnard occupied the presidential chair, with Mr. J. F. Haase as hon. secretary. The annual report (*V.N.*, xxiii., 57) gives the membership as 211, with 17 associates and 19 juniors; 28 papers were read, and the credit balance was increased by £16, notwithstanding £109 was spent on the *Naturalist*. At the July meeting great regret was expressed at the death of Mr. H. T. Tisdall, who had been a prominent worker and office-bearer of the Club for many years (*V. N.*, xxii., 56). The fifteenth conversazione of the Club was held at the Masonic Hall on the 19th and 20th October (*V. N.*, xxii., 104). This included an exhibition of wild-flowers. Illustrated lecturettes were given by Dr. T. S. Hall on "The Geology of the Eastern Suburbs," and by Mr. A. E. Kitson, F.G.S., on "The Upper Waters of the River Yarra." The exhibition of wild-flowers was privately visited by Her Excellency Lady Northcote, who evinced considerable interest in the display. A three-days' visit to Warburton was made in November (*V. N.*, xxii., 128). An illustrated lecture on Wilson's Promontory as a National Park was given in the Masonic Hall by Dr. T. S. Hall in February, 1906, before a very large audience (*V. N.*, xxii., 179). At the February meeting the leader, Mr. A. D. Hardy, gave an account of the first Club expedition to the National Park (*V. N.*, xxii., 191).

The new buildings of the National Museum were opened in April, 1906 (*V. N.*, xxiii., 23). At the April meeting Prof. A. J. Ewart, the newly-arrived Professor of Botany at the University, was unanimously elected a member of the Club.

1906-7.—Mr. Barnard again occupied the office of president, and Mr. J. A. Kershaw took the place of Mr. J. F. Haase as hon. secretary. The annual report (*V. N.*, xxiv., 43) showed that the roll contained 235 members, with 25 associates and 120 juniors. Twenty-eight papers had been read, and £11 added to the credit balance of the Club. At the annual meeting the retiring president (Mr. F. G. A. Barnard) gave an address showing how the facilities for the study of natural history had increased since the foundation of the Club in 1880 (*V. N.*, xxiv., p. 48). The feature of the year was the camp-out for a week at Mornington at Christmas, 1906, where, in addition to about thirty members, fifty State school teachers took part. Several of these afterwards became members of the Club, and remained constant for many years. The success of the outing was greatly due to the organizing ability of Mr. J. A. Leach (*V. N.*, xxiii., 195). The attention of the Railway Department was called to the geological features of several of the railway cuttings near Melbourne, and a request was made that they should be kept free of decorative vegetation. At the request of the Club Malleson's Glen was permanently reserved as a beauty spot (*V. N.*, xxiii., 135). In February the wholesale destruction of game was brought under the notice of the Department, and in March a gun tax and alteration of the duck season were advocated, while the destruction of the wattles, &c., in the grounds of the Kew Asylum were brought under the notice of the authorities.

1907-8.—The president for the year was Mr. G. A. Keartland, whom we still have amongst us, with Mr. J. A. Kershaw as hon. secretary. The annual report showed 241 members and 54 juniors. Twenty-six papers had been read, but the balance-sheet recorded a decreased credit balance by £2. Such questions as a close season for opossums, the destruction of fish by seals at Phillip Island, and the firing of the timber at Tommy's Bend, occupied several meetings. The Plant Names Committee, formed in August, 1906, presented its first report, and Prof. Ewart urged that members making new plant records should present specimens of the same to the Club or the National Herbarium for record (*V. N.*, xxiv., 95, 106). A memorable paper was read by Mr. O. A. Sayce, recording a new remarkable fresh-water crustacean found by him near Ringwood (*V. N.*, xxiv., 117). An old friend of many members of the Club—Mr. Charles Walter—passed away in September (*V. N.*, xxiv., 110). A remarkable incursion of the White Caper Butterfly on 30th November and 1st Decem-

ber is recorded (*V. N.*, xxiv., pp. 134, 148), and at the December meeting a member (Mr. Robert Hall) was congratulated on his appointment as Curator of the Hobart Museum (*V. N.*, xxiv., 138). At the January meeting the announcement was made of the permanent reservation of Wilson's Promontory as a National Park (*V. N.*, xxiv., 150). At the February meeting great opposition was expressed at the proposal to grant fifteen acres of the Domain as a site for the Melbourne Hospital (*V. N.*, xxiv., 162). In April we had to deplore the death of Dr. A. W. Howitt, a well-known scientist, and an honorary member of the Club. An appreciative record of his work, from the pen of Prof. Spencer, with a portrait, appeared in the *Naturalist* (*V. N.*, xxiv., 181). Notable excursions during the year were to Launching Place, in January (*V. N.*, xxv., 3); to Mount William (Lancefield) Aboriginal Stone Quarries, in February (*V. N.*, xxv., 9); and to Stony Point (Western Port), at Easter (*V. N.*, xxv., 52).

1908-9.—Mr. G. A. Keartland again occupied the presidential chair, and, owing to pressure of work, Mr. Kershaw handed over the secretaryship to myself. At the annual meeting Mr. Keartland gave an address on his twenty-one years' membership of the Club and the benefits he had derived from it (*V. N.*, xxv., 45). The annual report showed 212 members, 17 associates, and 81 juniors. Only 12 papers were read, while the funds showed a falling-off of £5. The sixteenth conversazione and exhibition of wild-flowers was held at the Masonic Hall on 22nd and 23rd September, 1908 (*V. N.*, xxv., 92), and was opened by His Excellency Sir Thomas Gibson Carmichael and Lady Carmichael. His Excellency, it will be remembered, was an enthusiastic entomologist. Illustrated lecturettes were given, by Mr. C. L. Barrett on "Wild Birds in Their Haunts" and by Prof. Ewart on "Carnivorous Plants." In November three days were spent around Toorourrong Reservoir (*V. N.*, xxv., 130). At the December meeting the first report of a biological survey of the National Park by the Government Botanist's Department was presented (*V. N.*, xxv., 142). Three days were spent at Healesville in January (*V. N.*, xxv., 171), and in February a good party visited that unique geological feature, Hanging Rock, near Woodend (*V. N.*, xxv., 192).

1909-10.—The presidential chair was occupied by Prof. Ewart, with Mr. F. G. A. Barnard as hon. secretary. The annual report (*V. N.*, xxvii., 39) showed 218 members, with 19 associates and 80 juniors. Nineteen papers were read, and £30 added to the credit balance of the Club. In August the rules were altered so that associates might obtain the *Naturalist* by an extra payment of two shillings and sixpence. The death of Dr. Halley, an early president and supporter of the Club,

took place in December, 1909 (V. N., xxvi., 143). A three days' visit to Toolangi in November (V. N., xxvi., 144) proved very enjoyable. In January, 1900, a three days' excursion was made to West Warburton (V. N., xxvi., 185).

1910-11.—Mr. F. Wisewould, one of the "original" members of the Club, held the position of president, with Mr. A. D. Hardy as hon. secretary. At the annual meeting Prof. Ewart gave a short address, pointing out the necessity for stimulating interest in the Club work. The annual report showed a membership of 224, with 51 juniors. Twenty-one papers had been read, while the credit balance of the Club had been reduced by £55. Our printing bill for the year was the heaviest for some time, and included £25 for illustrations in the *Naturalist*. At the June meeting opposition was expressed to the use of gay-plumaged birds as ornamental head-gear, and representations were made to the Commonwealth authorities to prohibit the importation of the same (V. N., xxvii., 39). At the July meeting Mr. R. T. Baker, F.L.S., of the Technological Museum, Sydney, gave a very interesting lecture, entitled "Our National Heritage: the Gum Trees" (V. N., xxvii., 58). At the April meeting congratulations were offered to Mr. O. A. Sayce on his appointment to a position in the Adelaide University, but unfortunately he soon after developed an acute attack of pneumonia, which ended fatally before the following meeting. He had been doing very promising work, and an appreciative memoir appeared in the *Naturalist* (xxviii., 25) from the pen of his friend, Dr. T. S. Hall.

1911-12.—Mr. F. Wisewould was again in the presidential chair, with Mr. A. D. Hardy as hon. secretary. The annual report recorded 227 members, with 11 associates and 45 juniors. Twenty-two papers were read, and the credit balance was increased by a few shillings. In May opposition was expressed to a proposal to abolish the office of Government Botanist (V. N., xxviii., 22). The retirement of Mr. Charles French, an original member of the Club, from the position of Government Entomologist, which he had held for some years, was announced in July. The first instalment of the provisional common names for Victorian plants appeared in the *Journal of Agriculture* for June, 1911. The 17th conversazione and exhibition of wild-flowers was held in the Masonic Hall on 26th and 27th September, 1911, when illustrated lectureries were given, by Prof. Skeats on "Geology in Relation to Scenery" and Dr. Leach on "The Birds of Australia" (V. N., xxviii., 124).

1912-13. For president Dr. J. A. Leach was chosen, with Mr. J. T. Hamilton as hon. secretary. The report showed that there were 214 members, with 3 associates and 65 juniors.

Twenty-one papers had been read, while the credit balance was reduced by £13. The report contains reference to the efforts made towards bird-protection and the proclamation of sanctuaries. The second Club excursion to Wilson's Promontory took place in December (*V. N.*, xxix., 163), and a visit to Phillip Island at Easter, 1913, resulted in an interesting report (*V. N.*, xxx., 29).

1913-14.—Dr. Leach was again elected as president, but in August, finding his departmental duties would not allow sufficient time to devote to the office, sent in his resignation, and Mr. J. A. Kershaw was elected in his stead. Mr. J. R. Tovey was elected hon. secretary. The annual report showed 219 members, with 5 associates and 16 juniors. Eighteen papers were read, while the credit balance was further reduced by £42, the *Naturalist* costing £126. At the June meeting Mr. A. E. Kitson, who was on furlough from Nigeria, was present, and gave an interesting lecture on that country. At the September meeting the rules admitting juniors at 1s. were rescinded. The wild-flower exhibition was held in connection with the exhibition of the Chamber of Manufactures at the Exhibition Building (*V. N.*, xxx., 116). An excursion made to Werribee Gorge on Cup Day, 4th November, 1913, was memorable on account of a fall of snow during the afternoon. Three days were spent at Baw Baw in January, 1914 (*V. N.*, xxx., 198).

1914-15.—The presidential chair was again occupied by Mr. J. A. Kershaw, while Mr. J. G. O'Donoghue commenced the first year of his service as hon. secretary. The annual report showed a slight falling-off in membership, there being just 200, with 4 associates. Fourteen papers were read, while £7 was added to the credit balance. At the August meeting the president acknowledged the presentation to the Club's library of a work on "The Butterflies of Australia," by Messrs. Waterhouse and Lyell, both members of the Club. Another excursion was made to the National Park at Wilson's Promontory at Christmas (*V. N.*, xxxi., 143). In November a visit was paid to an interesting geological feature, the Rocking Stone at Narre Warren, of which a photograph was reproduced in the *Naturalist* (*V. N.*, xxxi., 132).

1915-16.—For this year Dr. C. S. Sutton was president, Mr. J. G. O'Donoghue continuing as hon. secretary. The annual report recorded 209 members, with 3 associates. Only sixteen papers were read, but £5 was added to the credit balance. General depression was felt at the continuance of the war, and a proposal to hold an exhibition of wild-flowers at the Athenæum in aid of the Red Cross Fund for Wounded Soldiers was enthusiastically supported. The exhibition was opened by His Excellency Sir Arthur Stanley, and resulted in £54 4s. 11d. being handed to the fund. At the exhibition

illustrated lecturettes were given, by Mr. E. E. Pescott on "The Wild-Flowers of Victoria" and by Mr. J. A. Kershaw on "The Scenery of Wilson's Promontory." In December we had to mourn the loss of Dr. Hall, who had been in ill-health for some time. During his twenty-seven years' membership he had been a keen supporter of the Club, and his paper, "Ungarnered Grain" (V. N., xxvi., 124), will stand reading and re-reading time and again. A striking likeness, with a memoir from the pen of Professor Spencer, appeared in the *Naturalist* for January, 1916 (V. N., xxxii., 128).

1916-17.—For this year Mr. F. Pitcher, one of our "original" members, was elected president, with Mr. O'Donoghue as hon. secretary. The annual report showed 214 members, with 5 associates. Fourteen papers were read, and £3 15s. added to the credit balance. The year was a gloomy one for many members of the Club. The *Naturalist* of April, 1917 (V. N., xxxiii., 184), contained the honour roll of those twelve members on active service, together with the names of two daughters and twenty-eight sons of members who were also sharing in the trials and vicissitudes of the Great War. Unfortunately, six sons were already marked as having made the supreme sacrifice, and no less than seven others were added during the next year, so that the comparatively small band of members of this Club had more than their share of sorrow added to their lives by the war. The death of Mr. O'Donoghue, after a trying illness, in April, 1917, after a membership of nine years, left a blank in the list of workers which has not yet been filled. He was one of the greatest workers ever associated with the Club, and never thought of himself if anything could be done to forward the interests of the Club (V. N., xxxiii., 175). The exhibition of wild-flowers at the Town Hall on 3rd October, brought in £131 6s. 10d. for the War Service Fund of the Y.M.C.A.

1917-18.—Mr. F. Pitcher again occupied the presidential chair, with Mr. E. S. Anthony as hon. secretary. The annual report showed 222 members, with 7 associates. Twelve papers were read, and the funds increased by £8. A notable event in the year was an excursion to Belgrave on 27th October, at which His Excellency the Governor-General, Sir Ronald Munro Ferguson, G.C.M.G., was present (V. N., xxxiv., 113). He was subsequently elected an hon. member of the Club. The exhibition of wild-flowers at the Town Hall was again a great success, and brought in £212 5s. 1d. for the Y.M.C.A. Fund. Advantage was taken of the Railways excursion in September to visit Bendigo. A three days' excursion to Toolangi in January proved very enjoyable (V. N., xxxiv., 173), while the Easter excursion to Lakes Colac and Corangamite was productive of many interesting records both in the fauna and flora of the lakes (V. N., xxxv., 22).

1918-19.—The presidential chair was occupied by Mr. A. D. Hardy, F.L.S., with Mr. E. S. Anthony as hon. secretary. The annual report recorded 233 members—a slight increase, with a slight decrease in credit balance. At the annual meeting an exhibition of specimens was held, and His Excellency the Governor-General, Sir Ronald Munro Ferguson, G.C.M.G., attended and unveiled the Honour Roll, and a presentation of a pocket aneroid was made to Mr. F. G. A. Barnard in recognition of his twenty-five years' service as hon. editor. The third extensive exhibition of wild-flowers at the Town Hall yielded £141 2s. 9d. for the Y.M.C.A. War Fund. A week was spent at Marysville at Christmas, when an enjoyable outing resulted (*V. N.*, xxxv., 157). Mr. G. Coghill retired from the treasurership at the end of the year, after fifteen years of office, and was subsequently presented with a memento of his services.

1919-20.—Mr. A. D. Hardy, F.L.S., again occupied the presidential chair, and Mr. P. C. Morrison was elected as hon. secretary; however, after a few months' service he was compelled to resign owing to ill-health, and later Mr. E. E. Pescott, F.L.S., offered to carry out the duties until the annual meeting. The annual report showed a total of 246 members and an increased credit balance of £72, and in addition a war bond of £20. Early in the year the Club lost, by death, its first life member, Mr. B. R. Patey, at the ripe age of 91 years. Through the representations of the Club, Edwards Park, a recently-acquired reserve at Preston, was proclaimed a bird sanctuary. The Fisheries and Game Department was approached with regard to the increase of foxes at Phillip Island. An excursion to Bendigo in September (*V. N.*, xxxvi., 100) proved of great interest. The exhibition of wild-flowers was again a great success, £167 3s. 5d. being divided between the Anzac House Fund and a fund for publishing the vernacular plant names list. The retirement of Professor Sir Baldwin Spencer, K.C.M.G., from the Chair of Biology at the University and his services to the Club were referred to at the November meeting (*V. N.*, xxxvi., 110). With the closing of the war excursions again became a feature of the Club proceedings, the most notable one being to Loch Valley (*V. N.*, xxxvi., 153). At the February meeting several members gave short notes of their holiday rambles (*V. N.*, xxxvi., 150). At Easter three days were spent at Rosebud and Arthur's Seat (Dromana) (*V. N.*, xxxvii., 23). For the first time in its history the *Naturalists* for March and April were much behind their due dates, owing to the printers' strike.

Now my chronicling is done, and I trust whoever takes up the task for the next ten years will have as interesting a record to make as I have had. Whether the Club has accomplished

what was intended by its promoters is perhaps a matter of opinion. In my opinion it has. I have no hesitation in saying that the Club has been instrumental in making the fauna and flora of Victoria more intimately known than they would have been had it not existed. It has enabled persons of kindred tastes to meet together and become acquainted with one another, while the *Naturalist* has afforded means for recording a large amount of valuable information for the benefit of future workers and lovers of nature. In no publication will be found so much descriptive matter about the State of Victoria. Almost every one of its 8,452 pages contains something of interest, and members often tell me they take down a volume from their bookshelves and find articles that remind them of pleasant evenings spent at this hall or of outings in the country.

The result of the forty years may be reduced to figures in the following manner:—Papers read, 917; volumes of the *Naturalist* published, 36, containing 8,452 pages, at a cost of £3,195.

A summary of the balance-sheets shows:—

RECEIPTS.					
25 Years. 1880-1905.			15 Years. 1906-20.		Total.
Subscriptions	£2,617	..	£2,104	..	£4,781
Sales, &c., of <i>Naturalist</i> ..	443	..	290	..	733
Interest, &c.	20	..	54	..	74
Conversaziones	—	..	87	..	87
	<u>£3,080</u>	..	<u>£2,595</u>	..	<u>£5,675</u>
EXPENDITURE.					
<i>Naturalist</i>	£1,624	..	£1,571	..	£3,195
Rooms	287	..	184	..	471
Library	268	..	241	..	509
	(Bookcases £31)	..	(Bookcases £48)	..	
Management	676	..	531	..	1,207
Conversaziones	135	..	66	..	201
	<u>£2,990</u>	..	<u>£2,593</u>	..	<u>£5,583</u>

Credit balance, £92 (including War Bond, £20).

That the Club has been fortunate in its office-bearers is generally conceded, and the record of service may be of some interest. In all, 82 persons have held office during the forty years, the following reaching ten years or more:—F. G. A. Barnard, 37; G. Coghill, 29; J. Gabriel, 25; J. A. Kershaw, 22; C. French, 18; D. Best, 16; F. Wisewould, 16; A. D. Hardy, 15; T. S. Hall, 14; G. A. Keartland, 14; C. S. Sutton, 14; O. A. Sayce, 13; D. Le Souëf, 12; J. Shephard, 10; and H. T. Tisdall, 10.

Finally, may I call attention to the fine sum raised for war charities by the last five exhibitions of wild-flowers—viz., £622 8s. 9d.—which shows that the efforts of the Club in bringing under the notice of the general public the interesting nature of our Australian flora have been duly appreciated.

The Victorian Naturalist.

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No. 443.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 11th October, 1920.

The president, Mr. J. Gabriel, occupied the chair, and about seventy members and visitors were present.

CORRESPONDENCE.

From the Chief Secretary, in reply to the Club's protest against the revocation of the sanctuary for birds at Lake Hattah, stating that there was at present no intention of abolishing the sanctuary.

REPORTS.

A report of the excursion to Toorourrong, Plenty Ranges, on Saturday, 18th September, was given by Mr. C. Lambert, who said that, owing to doubtful weather, only a small party took part in the excursion. A fair number of wild-flowers had been met with, and the members greatly enjoyed the picturesqueness of the locality.

A report of the excursion to Alphington on Saturday, 25th September, was given by the leader, Mr. J. Searle, who said that, notwithstanding the recent heavy rains and more or less flooding of the lagoons, pond-life was abundant, though nothing of particular note had been taken.

A report of the excursion to Wattle Park, Riversdale, on Saturday, 2nd October, was given by Mr. A. L. Scott, who acted as leader. A fair number of members attended, and had an enjoyable ramble.

A report of the excursion to Langwarrin on Saturday, 9th October, was given by the leader, Mr. E. E. Pescott, F.L.S., who said that about thirty took part in the outing. Captain-Chaplain A. F. Gates, M.A., met the party, and, accompanied by a local bird enthusiast, piloted the members throughout the day. The party was entertained with morning lunch and late dinner at Langwarrin Camp by the Commandant, Major Condor, O.B.E., who also gave a hearty welcome to the visitors. Very many wild-flowers and birds were noted. The object of the excursion was orchids, of which twenty-three species were collected. Included in these were *Pterostylis barbata*, *Caleya major*, and *Caludenia cordiformis*. *Glossodia major* and *Thelymitra antennifera* were in great abundance, while several fine specimens of *Thelymitra longifolia* were found with stems over three feet in length. The outing was thoroughly successful and greatly enjoyed. On the motion of Messrs. Pescott and

Williamson it was resolved that a letter of thanks be forwarded to the gentlemen mentioned for their assistance on the occasion.

ELECTION OF MEMBER.

On a ballot being taken, Miss F. E. Tole, Eye and Ear Hospital, Melbourne, was duly elected a member of the Club.

GENERAL BUSINESS.

The hon. treasurer, Mr. F. Pitcher, reported that the recent exhibition of wild-flowers had been a splendid financial success. The receipts to date showed a profit of nearly £100, so that funds would be available to undertake the publication of the proposed hand-list of Victorian plants.

On the motion of Messrs. Pitcher and Armitage, a resolution was unanimously carried thanking those members and their friends who so freely gave their time and assistance to the effort, and thus ensured the great success of the exhibition, both financially and botanically.

A vote of thanks to Rev. L. Wenzel, St. Phillip's Vicarage, Abbotsford, and to Mr. W. Butcher, town clerk, Collingwood, for the loan of tables free of charge, was carried unanimously.

Regret was expressed that numerous parcels of wild-flowers, both for exhibition and sale, had been sent without the names and addresses of the contributors, and it would thus be impossible to acknowledge them.

Attention was also called to the loss sustained by Mr. P. R. H. St. John on the night of the exhibition, when a suitcase containing botanical works of reference, and notes (the result of years of observation), was taken from the hall by some unauthorized person. It was decided to offer a reward for the recovery of the books, &c.

REMARKS ON EXHIBITS.

Mr. C. Daley, B.A., drew attention to his exhibit of granite, containing tourmaline, from Wilson's Promontory.

PAPERS READ.

1. By Messrs. E. E. Pescott, F.L.S., and C. French, jun., entitled "Four Species of Orchids New for Victoria."

The authors briefly described the superficial characteristics of four species of orchids new to the State, two of which are new to science. These were *Caladenia alba*, collected at Mount Dandenong by Master Jack French; *Caladenia cardiochila*, collected at Grantville (Western Port) by Mr. W. Wallace; *Caladenia iridescens*, new to science, collected at the Grampians by Mr. E. E. Pescott, F.L.S.; and *Caladenia cordiformis*. The last-named species has long been known as *C. Cairnsiana*, but it had recently been determined to be different from *C.*

Cairnsiana, which is confined to Western Australia, and must therefore be regarded as new to science.

2. By Mr. E. E. Pescott, F.L.S., entitled "The Orchids of Victoria."

The author briefly referred to local orchid literature, especially to the work of Messrs. C. French, sen., C. French, jun., and A. B. Braine, adding some historical notes concerning several species. The paper was illustrated by about sixty lantern slides, some of which were in natural colours. Most of the Victorian species were referred to, and the progress made in orchidology since 1908, when the "Recording Census of the Victorian Flora" was published, was remarked on. That list showed ninety-four species, but four of these had since been deleted as having been recorded in error. Since that date thirty-three species had been added, so that the Victorian list now stands at 123 species.

Mr. H. B. Williamson congratulated the author on his beautiful lantern slides, which, he said, should further popularize this most interesting group of plants. He remarked that he had found the tubers of *Dipodium punctatum* intertwined with eucalyptus roots, but not drawing nutriment from them, although their relative positions might easily lead to the supposition that the orchid was parasitic.

Mr. C. C. Brittlebank hoped the author would publish short descriptions of the more recently named species, and so help observers to record new localities.

EXHIBITS.

By Mr. R. W. Armitage, M.Sc. — Living specimens of *Branchinella australis*, a phylloped fresh-water crustacean, found in shallow temporary pools at Elwood.

By Mr. C. Barrett, C.M.Z.S. — Nest of Grey-rumped Swiftlet, *Collocalia francica*, from Dunk Island, North Queensland.

By Mr. C. C. Brittlebank. — Coloured drawings of several species of Victorian orchids.

By Mr. E. Cox. — Specimens of Droseraceæ, including *Drosera auriculata*, *D. Menziesii*, *D. peltata*, *D. Whittakeri*, and *D. glanduligera*.

By Mr. F. Cudmore. — Fossils, *Schizaster abductus*, Tate, from Upper Janjukian of Morgan, S.A.; also *S. cf. sphenoides*, T. S. Hall, a rare Kainozoic echinoid from same beds.

By Mr. C. Daley, B.A. — Coarse-grained granite containing tourmaline; portion of nodule of flint found on Western Beach (from similar nodules the aborigines were accustomed to strike off chips for cutting purposes); flint core and chips from kitchen middens; specimen of *Pimelea linifolia*, Slender Rice-flower, with crimson-tipped florets — all from Wilson's Promontory.

By Mr. Chas. Oke.—Forty-two species of Coleoptera, many communal with ants, collected during Bendigo excursion, 11th–12th September.

By Messrs. E. E. Pescott, F.L.S., and C. French, jun.—Herbarium specimens of *Caladenia alba*, R. Br., *C. cordiformis*, Rogers, n. sp., *C. iridescentis*, Rogers, n. sp., and *C. cardiochila*, Tate, all new for Victoria, in illustration of first paper; also twenty-three species of orchids, fresh specimens, including *Pterostylis cucullata* (cultivated in pot) and *Dendrobium striolatum* (cultivated), in illustration of second paper.

By Mr. L. Thern.—Orchids, *Glossodia major*, *Caladenia carnea*, *Pterostylis falcata*, *P. nutans*, &c., collected at Woori Yallock.

By Mr. H. B. Williamson.—Specimen of *Acacia triptera*, Spur-winged Acacia, collected by exhibitor in the Warby Ranges, near Wangaratta, 20th September, 1920, new for Victoria, hitherto recorded only from Queensland and New South Wales: Victorian specimens of Pultenæe, viz.:—*P. daphnoides*, var. *parvifolia*, *P. Maideni*, *P. polifolia*, *P. paleacea*, var. *Williamsoni*, *P. altissima*, F. v. M., *P. paleacea*, var. *sericea-robusta*, and *P. capitellata*, Sieb.

After the usual conversazione the meeting terminated.

EXHIBITION OF WILD-FLOWERS.

THE Melbourne Town Hall on Tuesday, 28th September, was again the scene of the annual exhibition of wild-flowers organized by the Field Naturalists' Club of Victoria. Unfortunately, though applied for several months before, the main hall could not be secured, and the Club decided to make use of the upper hall. This, it was thought, would afford sufficient space, but it was quickly seen, as soon as the doors were opened, that the interest in Australian wild-flowers had been so stimulated during recent years, mainly by the exhibitions of the Club, that great difficulty would be experienced by the numerous visitors in getting more than a distant glimpse of the flowers.

From the takings, &c., it is estimated that at least 1,600 persons visited the exhibition during the afternoon and evening.

The president, Mr. J. Gabriel, in asking the Lieutenant-Governor, Sir William Irvine, K.C.M.G., to declare the exhibition open, gave a brief outline of the aims and objects of the Club. Sir William Irvine expressed his appreciation of the Club's efforts towards fostering a love for Australian flowers, which he considered most interesting, and well worthy of greater attention than had hitherto been bestowed on them by horticulturists and others. In glancing at the exhibits he was

reminded of many journeys in different parts of Victoria, where the scene was often like an extensive flower-garden. He hoped the exhibition would lead to further development of our floral resources, and regretted that Lady Irvine was not able to accept the Club's invitation to be present.

The display of flowers was quite equal to previous efforts, and included flowers from distant parts of the State as well as from New South Wales, Queensland, South and Western Australia.

A fine display of cultivated Australian flowers was made by the Director of the Melbourne Botanic Gardens, Mr. J. Cronin, F.R.H.S., who also forwarded foliage and pot-plants for decorative purposes. Among the flowers, of which about fifty species were exhibited, may be mentioned *Eucalyptus torquata* (W.A.), *Telopea speciosissima* (N.S.W.), *Oxylobium alpestrum* (Vic.), *Chamaelaucium uncinatum* (Geraldton Wax-flower, W.A.), *Hovea elliptica* (W.A.), and *Boronia pinnata* (V. and N.S.W.) A collection of Victorian ferns in pots was contributed by Mr. F. Pitcher. Cultivated Australian flowers were also shown by Mr. Geo. Coghill, Canterbury, and Mr. J. M. Watson, "Maranoa," Balwyn.

One of the daintiest and most interesting displays in the exhibition was a collection of fifty species of orchids made by Messrs. E. E. Pescott and C. French, jun., and arranged by Mrs. C. French, jun., and Mrs. Coleman. Among the species exhibited were *Sarcophilus falcatus*, *Thelymitra grandiflora*, *Diuris alba*, *Calochilus Robertsoni*, *Pterostylis alpina*, *Caleana major*, *Acianthus caudatus* (green form), *Chiloglottis Pescottiana*, and *C. trapeziforme*.

To the Stawell Horticultural Society the Club was indebted for a fine collection of flowers representative of the Grampians flora.

A number of members and friends exhibited botanical objects under microscopes. These were in charge of Mr. F. Chapman, A.L.S., who reports that the visitors evinced great interest in the display. The following are the details of the exhibit :— By Mr. E. T. Carter, fern sporangia ; Mr. F. Chapman, A.L.S., crystals of berberine and fruiting sea-weeds ; A. D. Hardy, F.L.S., rotation in leaves of *Vallisneria*, pollens of eucalypts and acacias ; C. A. Lambert, plant sections ; J. Laver, wood sections ; J. Stickland, spirogyra ; and J. Walter, sections of pollen grains, to show structure.

There was a large demand at the flower stall, and Mrs. Edmondson and her assistants were busily occupied, especially in the afternoon. The *Boronia* and Wax-flower (*Eriostemon*) forwarded by Mr. D. J. Paton, of Bendigo, were great favourites, while the singular Kangaroo Paws from Western

Australia quickly found purchasers. The sales of flowers realized £22. This amount would have been larger had not a consignment of Waratahs, ordered from Sydney, been delayed in transit, thus missing the exhibition.

Afternoon tea was provided by another band of ladies under Miss Gabriel and Mrs. Barnard, who experienced a heavy demand on their department, and handed over £12 6s. as the result of their efforts.

The list of members and friends who forwarded flowers is very imperfect from the fact that many persons omitted to attach to the packages either their name or the locality where collected. So far as could be ascertained, the following were exhibitors:—New South Wales.—Matron Cornwall, Red Cross Convalescent Home, Wentworth Falls; Mrs. A. Singleton, Corowa. Queensland.—The Director, Botanic Gardens, Brisbane; Queensland Field Naturalists' Club, Brisbane. South Australia.—Field Naturalists' Section, Royal Society of South Australia, Adelaide. Western Australia.—Miss Mason, Cottesloe; Mr. — Fisher, Perth; Mr. E. A. Sims, Perth; Mr. J. D. Gloster, Kelmscott (Kangaroo Paws). Victoria.—J. W. Audas, South Yarra; F. G. A. Barnard, Croydon; D. Best, Kew; Miss K. Brooks, Maldon; A. Burns, Ringwood; Miss L. Barker, Castlemaine; Mrs. Coleman, Blackburn; G. Coghill, Moe; Miss C. C. Currie, Lardner; Miss C. Coutts, Pyans Creek, Stawell; C. Daley, Wilson's Promontory; Mrs. W. F. Dyall, Drouin; Mrs. Evans, Lima East; — English, Mount Evelyn; — Ford, Greensborough; Mrs. C. French, jun., Canterbury; Mrs. J. Grylls, Dingee; Master Harry, Mentone; Mrs. Harbeck, Heyfield; Dr. N. Henderson, Mildura; Miss Howard, Lubeck; — Hughes, Warook; D. Matthew, Footscray; — Morcom, Stawell; Miss G. Nethercote, Hawthorn; Miss G. Nokes, Sandringham; C. Oke, St. Kilda; D. J. Paton, Bendigo; F. Pitcher, Belgrave; E. E. Pescott, Camberwell; F. Rich, Rushworth; K. Scule, Sandringham; Ling Ah Mouy, Belgrave; Miss L. Thomas, Stawell; H. S. Williamson, Dandenong; F. Wisewould, Pakenham; Mrs. R. Ward, Moe; Jas. Young, Stawell; Mrs. Young, Stawell. It should be noted that in many cases the places named are the addresses of the exhibitors, and not the localities where the flowers were collected.

Flowers were also received from the State schools at Dandenong, Diamond Creek, and Lima East, and from the caretaker at Yan Yean Reservoir.

Many interesting flowers were exhibited, but it has been found impossible to record their names. More or less complete series of the following orders were grouped together:—*Epacridæ*, *Rutacæ*, *Compositæ*, *Leguminosæ*, *Myrtacæ*, *Proteacæ*, and *Labiataæ*.

TO THE ALPS FOR COLEOPTERA

By D. BEST.

(Read before the Field Naturalists' Club of Victoria, 9th Aug., 1920.)

IN the middle of January last a fellow-member (Mr. J. E. Dixon) and myself agreed on a visit to the Hospice on Mount St. Bernard, the crossing-place of the road from Bright to Omeo, and about 5,000 feet above sea-level, in the hope that the locality would yield some rare specimens for our collections. As no doubt some of you have visited the Hospice, I will merely say that the building is old, and really wants replacing by one more up-to-date. We, however, received very fair treatment, and have nothing serious of which to complain. All the same, it is not a place suitable for ladies. The proprietor (Mr. Thompson) and his wife being away at the time, there was some delay in receiving a reply to my letters asking for particulars as to how we were to get there; but a friend of theirs in Bright wrote me that the proprietor's car would meet us on arrival of the train and take us straight up. Thus it happened that we reached the Hospice about 7 o'clock in the evening, doing the whole journey from Melbourne (224 miles) in about thirteen hours. It was very cold, and, in fact, during our five days' stay we did not experience one really hot day. The nights were always more or less chilly, necessitating, on one occasion, a big log fire and plenty of blankets on the beds.

One reason for our preferring the Alps to the Buffalos, where there is good accommodation, was that the country has not been nearly so much mutilated by "trippers," and, excluding the destruction by fires, the place remains practically in its natural state. The results of our collecting were not so good as we expected—whether from the mild season or the result of fires we cannot say. The flowers of the Snow Gums, *Eucalyptus pauciflora*, had all disappeared, and the only shrubs we saw in flower were a small patch of *Leptospermum*, sp., and some *Leptospermum scoparium* (?) on the banks of the Dargo River, near its source, just below the Hospice, on the Gippsland side. From the former we took three specimens of a Buprestid quite unknown to us, and possibly new, and a couple of a dark variety of *Hesthesia cingulata*, similar to specimens I had taken on the Bursaria at Walsh's Creek, near the head of the Yarra. The flowering of the Snow Gums being over, we had no prospect of obtaining any of that fine beetle *Tragocerus lepidopterus*, the only sign we saw of them being the wing-cases of a female. This beetle must, I think, take a rather long period to mature—probably at least three or four years—as the larva works round the whole of the root of the Snow Gum it enters, and the half of one which I am exhibiting this evening

will give you some idea of the work it does. This root, with others containing larvæ, I brought down some years ago, but I was not successful in rearing a single specimen. On two occasions in different years, in the month of December, the male was flying about in numbers. I suppose there must have been on each occasion at least twenty to thirty, but no females were flying. They had to be carefully searched for where they were resting, on the butts of the trees, and our reward was only four specimens.

The "Woollybutts," *E. longifolium*, were in flower, but, as they were all tall trees, we had no opportunity of testing whether there was life on them: but we feel pretty sure there must have been. Under loose bark we were fortunate in securing several specimens, both male and female, of that uncommon and hitherto rare beetle, *Enneaphyllus rossi*, so named after a one-time member of the Club, Mr. G. G. Ross, who has the credit of being the first to capture it. It differs slightly from the Tasmanian species, *E. annicipennis*, the latter being a rather longer insect and the male having also longer antennæ. It is a night-flier, and the body is of so light a texture that its life must almost necessarily be a short one. As against this theory is the fact that my previous captures were made in Gippsland, about North Mirboo, at Easter—which would be about March or April. Our attempts to bring one or two alive to Melbourne were a failure, as they all died after one or two days' confinement in boxes. It breeds in the roots of the Snow Gums, and also in logs, especially burnt ones, as with both we saw many signs of the entrance of the larvæ, the signs being the wood powder they throw out. It is, judging by these signs, rather a plentiful beetle, and I fancy that the life of the larvæ in the wood does not exceed twelve months. The beetle, in all probability, feeds on the flowers of the "Woollybutts," *E. longifolium* (?). The male has long, laminated antennæ, as you will see by the specimen exhibited this evening, and I have wondered if these are principally for ornament: but no doubt they also serve some other object in nature. Also you will notice the bright metallic sheen on the wing-cases, and this sheen lasts for some considerable time after death. Another beetle of as light a texture as this is a cockchafer, *Rhopaea heterodactyla*, also a night-flier, and on one visit to Parwan we found a large number of dead ones under stones, all with their light bodies completely drained by spiders, and nothing left but thin shells.

Under loose bark we took four specimens of a fine large longicorn, a species of *Tryphocharia*, quite new to us, and not, so far as we know, in the possession of other collectors or the Museum. We do not know where it breeds, but most likely,

like others of the species, in the larger eucalypts. Curculios, especially Amyctidids, were very scarce, and we only secured one of the latter, an *Acantholophus*, probably *A. apicola*, a rather rare species, under a stone, and, although we turned over many others, we were not fortunate enough to secure a second one. Shaking the acacias, *A. penninervis*, with which the locality abounds gave very poor results, there being little life of any kind on them, our best captures being three specimens of a *Symphyletes*, of which I had only one in my collection, and this was also taken from off an acacia on the Alps, but not *A. penninervis*. On previous visits the longicorn beetle, *Macrones besti*, was fairly plentiful, but on this occasion we did not see a single specimen, nor did we see any signs of it breeding in the acacias, its habitat. We secured a few larvæ of a longicorn in the roots of the acacias, but we think if they run their course they will prove to be only the common *Uracanthus triangularis*, and, if so, they have adopted a different method to what they do around Melbourne, where they favour the dead branches of *A. pycnantha* and *A. mollissima*. In the gullies, under logs (of which there were plenty), we secured a fair number of carabs, but, whilst a few were rather rare, none was new to us. Amongst others were *Notonomus gippslandicus* and *N. gippsiensis*. Of other families we took *Adelium subdipressum*, *Apasis*, var. *howitti*, *A. biplegenoides*, *Lepispelus stygranus*, and *Coripera*, sp., also two specimens of *Rhyssonotus parallelus*.

Lepidoptera (butterflies and moths) were singularly scarce, and, so far as regards the former, were in marked contrast to previous experiences on the Alps, when they—especially the common white, *Pieris teutonia*—were then to be seen in thousands, literally thousands, for in walking along the Omeo road you could not avoid treading on them at every step; they were all flying northwards.

To birds we did not pay much attention, but in any case not many were to be seen. In the gullies we expected to see or hear the Lyre-bird, but our luck was out, and our hopes were not gratified.

Of reptiles all we saw was a few lizards; of snakes we did not see one. In the valley of the Dargo River, where they were supposed to be numerous, and where we worked through the thick scrub and grass, which would afford plenty of shelter, we neither saw nor heard any. Possibly the noise we made disturbed them, and they slid silently away. One thing is certain: we could have been the only disturbers, for during our five days, except on the Omeo road, we never saw a human being or an animal. This will give you some idea of how little the place is frequented by visitors. May it long remain so!

As showing the mildness, not to say coldness, of the summer, clusters of the yellow and black Ladybird, *Halyzia melbyi*, were frequently found sheltering themselves under stones. Under ordinary circumstances they would have been found on the various shrubs. I would like to say that at no time were we more than about two miles from the Hospice, as our experience of many years has proved to us that in collecting insects it is not the distance you travel, but rather the careful inspection of a limited area, that counts.

At one time the Hospice maintained a flock of goats, and from these the visitors always got fresh milk, but now one has to be contented with the condensed article. The goats, however, are still in evidence, and may be seen at times from the Hospice on the steeper side of Mount Smythe. They have gone wild, and probably in the near future may afford good sport—not, perhaps, equal to the Swiss Chamois—to those visitors who may like a bit of difficult hunting. I trust they will not be interfered with for some time, so that they may increase and spread over the numerous hills.

Since writing the above I have quite recently heard that Mr. and Mrs. Thompson have temporarily removed from the Hospice, so that now only a man is left to cater for—shall I say unfortunate?—visitors.

At Harrietville, at the foot of the Alps, we stayed for a couple of days, but were not very successful, insect life being far from plentiful. Our best captures were a longicorn of the genus *Tryphocharia*, similar to some taken by Mr. Dixon at Gisborne, supposed to be new, and, so far as we know, these are the only two places where there are any records of it—truly a very wide distance apart; also one specimen of that large Clerus beetle, *Natalis titana*. Nearly all others were similar to what is found around Melbourne. At the time of our visit there should have been an abundance of life on the young gums, but it was not so. Even the common Ladybirds, *Paropsis* and *Cadmus*, were almost entirely absent. There were, however, a few of the large common brown cockchafer, *Anoplognathus analis*.

At this place (Harrietville) we had, through the influence of a friend, obtained permission to accompany him through a mine which has had many ups and downs, but is now again doing very well, having recently come on to the dividend list. The mine is the Rose, Thistle, and Shamrock, and the tunnel through which we were taken to reach the workings is 2,000 feet long, and, we were informed, took over fifteen years to drive—a fact easily to be believed when one looks at the solid rock through which it was driven. The reef varies in thickness and in richness, but to our inexperienced eyes it looked poor, but we were told it was averaging at least one ounce

to the ton, which is fairly good. The mine is situated some distance up the hills, and the country round about is almost in its natural state, except that many big trees have been cut down for mining purposes. Round about the mine we noticed three Cetonids flying—*Schizorhina gulosa*, *S. phillipsi*, and *S. dorsalis*—but so quick was their flight that our efforts resulted in the capture of only one of the last-named.

Harrietteville, until comparatively recently, boasted three hotels, but two have closed their doors. However, we have pleasure in stating that the remaining one is well conducted, and offers good inducement to visitors to prolong their stay.

We put in a day at Bright, the railway terminus, and this was more than sufficient to satisfy us that our time was and would be wasted if we stayed longer. All along the Owens River the *Bursaria* was in splendid flower, but in all my long experience I can never recollect an occasion on which there was so little life on it—not even bees or flies were on it: neither was there any life on the acacias or young gums, and it was a feeling of relief to us when the evening came and we knew we were leaving for home the following morning. No more Bright for us, but we were certainly favourably impressed with the possibilities of Harrietteville, and if we ever repeat the trip we will assuredly give it another trial.

Of course, we saw plenty of that noxious and (so far as we know) useless weed, the St. John's Wort. It was well in flower and growing plentifully around the Hospice and the hills at Harrietteville, and is spreading rapidly. No attempt seems to be made to cope with it, and, to our minds, this and the almost equally objectionable blackberry will in the near future obtain complete control of the district, and thus the one-time very fertile valley of the Owens will become absolutely valueless for settlement. Then, again, there is the dredging, which has destroyed thousands of acres of valuable land, and it will take many years, if ever, for Nature to recover itself. In places you cannot get near the river for the brambles, so thick are they: and it is perhaps within the bounds of possibility that they may eventually obtain mastery over the St. John's Wort. About some parts of Bright there is little or none of this weed, notably in and around the railway, and it struck us as peculiar that, especially where there was an abundance of couch-grass, it was almost entirely absent. Not being a scientist, I am reluctant to advance a theory that some stronger plant may eventually be found that will kill it out on the lower grounds; but on the hills the only prospect is plant suicide. I really believe that in time, perhaps soon, the plant will be applied to some good business purpose, for it is a poor plant indeed that does not possess at least one good quality. As to the blackberry, it is an absolute scandal and disgrace to all

concerned, including the Shire Council and the Government, that nothing is being done to check its further spreading. At places you cannot get near the river, so dense is it, and it is rapidly spreading over the hills: nothing seems to stop it. Altogether, the trip was a most enjoyable one, and, all being well, we hope to repeat it during next December.

THE GENUS *PULTENÆA*.—Many of the species of the Leguminosæ are very puzzling to botanists, but perhaps none so difficult as the *Pultenæas*. In the recently-issued *Proceedings of the Royal Society of Victoria*, vol. xxxii. (new series), part 1, Mr. H. B. Williamson, in a paper entitled "A Revision of the Genus *Pultenæa*, Part I.," deals critically with about half (fifty) of the known species. The genus, which is confined to Australia, has long been in a confused state as regards limitation of species, and the author, by means of short descriptive and comparative notes and simple diagnostic drawings, seeks to clear up some of this confusion. In his introductory remarks he outlines the factors which have guided him generally in determining the species. The work was undertaken at the suggestion of Prof. Ewart, and all the material at the National Herbarium, as well as specimens forwarded by the Government Botanists of the other States, were carefully examined. The following are the alterations and additions made:—*P. daphnoides*, Wendl., par. *parvifolia*—Upper Murray, C. French, jun., 1886, Eldorado, H. B. Williamson, 1920; *P. Millari*, var. *angustifolia*, Qld.; *P. paleacea*, var. *sericea-robusta*, Qld.; *P. largiflorens*, F. v. M., var. *latifolia*, S.A.—all new varieties; *P. Maidenii*, Reader, which has been regarded as a doubtful species, is allowed; *P. flexilis*, var. *altissima*, Benthani is followed, and the plant treated as a distinct species under the name of *P. altissima*, F. v. M.; *P. capitellata*, Sieb., placed by Benthani under *P. stricta*, Sims, is restored to specific rank. The two last-named should be added to the Victorian list, *P. flexilis* being deleted. The following species are not considered valid:—*P. Williamsonii*, Maiden = *P. paleacea*, var. *Williamsonii*; *P. mucronata*, F. v. M. = *P. polifolia*, Cunn., var. *mucronata*; and *P. cinerascens*, Maiden and Betcher = *P. microphylla*, Sieb., var. *cinerascens*. In the concluding part, which has not been published yet, the author deals with some thirty species, of which four are considered as new to science.

THE LATE PROFESSOR SACCARDO.—The *Brooklyn Botanic Garden Record* announces the death of Prof. Pier Andrea Saccardo, Professor of Botany in the Royal University of Padua, Italy, at the age of seventy-four, after a life devoted to the progress of botanical science, more especially of mycology. He was the author of "*Sylloge Fungorum*," a work of twenty volumes, commenced in 1882 and completed in 1913.

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No. 444.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday, 8th November, 1920.

The president, Mr. J. Gabriel, occupied the chair, and about sixty members and visitors were present.

CORRESPONDENCE.

From Major V. T. Conder, O.C., Langwarrin Camp, acknowledging the thanks of the Club, and stating that he would be delighted to see members of the Club at the camp at any time.

REPORTS.

A brief report of the excursion to Cheltenham on Saturday, 16th October, was given by the leader, Dr. C. S. Sutton, who said that the party had not proceeded so far as Heatherton, and had met with only the usual spring flowers of the coastal district.

The leader, Mr. H. B. Williamson, said that the excursion to Dandenong, fixed for Saturday, 23rd October, had to be abandoned, owing to the exceptionally heavy rain, which continued nearly all the day.

A report of the excursion to Lerderderg, *via* Bacchus Marsh, on Saturday, 30th October, was, in the absence of the leader (Mr. C. C. Brittlebank), given by Mr. C. French, jun., who said that the excursion had been well attended and an enjoyable day spent in the gorge of the Lerderderg River. A number of interesting plants and insects had been met with. Nine species of micro-fungi had been collected, one of which, *Puccinia carduiipycnocephali*, found on the Shore Thistle, *Carduus pycnocephalus*, being the first record for Australia.

ELECTION OF MEMBERS.

On a ballot being taken, Miss Mary Marquard, Trained Nurses' Club, 452 Lonsdale-street, Melbourne; Mr. T. Green, 35 Merton-street, Albert Park; Dr. P. H. Justesen, 42 Morrah-street, Parkville; and Mr. S. R. Mitchell, "Lurnea," Sunnyside-avenue, Camberwell, were duly elected as ordinary members, and Mrs. A. W. Bridgland, "Elfin Grove," Olinda, as a country member of the Club.

GENERAL BUSINESS.

The president referred to the death of Rev. W. W. Watts, F.L.S., a comparatively new member of the Club, and who was an authority on ferns and mosses. On the motion of

Messrs. Pitcher and Williamson, a letter of sympathy was directed to be sent to his relatives, the motion being carried in silence, the members standing.

With reference to the report of the exhibition of wild-flowers in the November *Naturalist*, the hon. secretary said that the acknowledgment of flowers from "— Hughes, Wartook," should read "Mrs. Kimberley, Wartook." "H. Hughes, Wilson's Promontory, Mr. J. H. Maiden, F.L.S., Sydney Botanic Gardens, and Stawell State school" should be added.

The chairman asked for suggestions as to arrangements for future exhibitions. Mr. H. B. Williamson said that the country schools should be more freely used as collectors and exhibitors, and circulars should be sent out immediately after Show week. He advocated the holding of the exhibition a fortnight later than hitherto. A larger working committee should be appointed. A better label could be devised, and there would be less delay on the railways if freight were prepaid. All exhibits should be available for the purposes of a classification table.

Mr. E. E. Pescott advocated the exhibition being open to the public from 3 to 10 p.m., as many persons could pay a visit after business hours—between 5.30 and 7 p.m.—when it was now closed. More prominence should be given to notices requesting visitors not to touch the flowers.

Mr. C. Daley, F.L.S., was also of opinion that the exhibition should be held later, and suggested the establishment of an inquiry bureau, where visitors could get information as to exhibits.

Mr. F. G. A. Barnard favoured an earlier date for the exhibition, saying that hot, drying winds usually made their appearance in the first and second weeks of October, which were fatal to the lasting powers of cut wild-flowers. He thought if suggestions were called for at the June meeting it would be possible to make provision for trying some of them.

Miss G. Nokes suggested that, in order to see the complete range of the native flora, two or three smaller exhibitions might be held in addition to the principal one.

Mr. D. Best thought that a successful exhibition once a year was as much as could be expected of the members to undertake.

The chairman said that he was pleased to announce that Mr. St. John's books, &c., stolen during the wild-flower exhibition, had been recovered, though in a somewhat damaged condition.

Reference was made by Mr. F. G. A. Barnard to a recent letter in the *Argus* by Mr. J. W. Audas F.L.S., calling attention to the destruction of flowering plants in the Grampians. He moved that a letter be sent to the Forests Department asking

that closer supervision be exercised with regard to visitors at the Grampians. Mr. Beuhne said the fires always occur after the sheep have been taken out of the hills. The motion was seconded by Mr. E. E. Pescott, F.L.S., and carried unanimously.

PAPER.

Owing to the failure of a valve of the oxygen apparatus, the illustrated paper by Mr. F. Chapman, A.L.S., on "The Tertiary Flora of Australia," had to be postponed, the exhibition of lantern slides being essential.

NATURAL HISTORY NOTES.

Mr. F. Chapman, A.L.S., gave a short explanation of the occurrence known as "musical sand."

Mr. F. G. A. Barnard mentioned that, when at Bacchus Marsh on 31st October, he had seen a butterfly cross the road which he believed was *Papilio sthenelus*, Macleay, the Chequered Swallow-tail, a rare butterfly in Victoria, and stated that a specimen of this butterfly had been taken during an excursion to the locality some thirty years before. He also asked if members had noticed the prevalence lately of the little Bordered Sulphur Butterfly, *Terias smilax*, Don. He had seen it at Kew, Bacchus Marsh, Brighton, and Black Rock—at the latter localities in quite large numbers. Usually only a few specimens of this species are seen in a season. Anderson and Spry, in their work, "Victorian Butterflies," record a similar occurrence in 1886-7. Mr. C. Oke said he had seen a specimen of *Papilio sthenelus* at the Lerderderg on the 30th October.

Mr. F. Spry said that the Lesser Wanderer Butterfly, *Danaus petilia*, Stoll., was commoner than usual this season. He had seen one flying in the city.

Mr. E. Wilson said that during a recent visit to Queensland he had seen thousands of butterflies of several species at the Darling Downs and the Blackall Ranges.

Mr. C. French, jun., remarked that the Cut-worm Moth, *Mamestra ewingi*, was very plentiful this season, which indicated a bad time for the farmers.

The chairman drew attention to the exhibit by Mr. N. W. Cayley of several beautiful paintings of Australian birds' eggs, which are being prepared for reproduction in a new work on Australian and Tasmanian birds and their eggs. Mr. E. Wilson also remarked on the excellence of the paintings, and said that the letterpress of the work was in the hands of Messrs. D. Le Souëf and C. Barrett.

EXHIBITS.

By Mr. C. C. Brittlebank and Mr. C. French, jun.—Nine species of micro-fungi collected on excursion to Lerderderg,

one species of which—*Puccinia carduiptycnoccephali*, found on leaves of Shore Thistle, *Carduus pycnocephalus*—being the first record for Australia.

By Mr. Neville W. Cayley.—Colour-drawings of eggs of Australian birds.

By Mr. F. Cudmore.—Fossil leaves from the Carbo-Permian of Blue Mountains, N.S.W.: *Glossopteris Browniana* and var. *linearis*; also fossil ferns, &c., from Lower Carboniferous (Coal Measures), Radstock, Somerset, England.

By Mr. Chas. Daley.—"Musical sand" from Norman Bay, Wilson's Promontory.

By Messrs. C. French, jun., and E. E. Pescott.—Sickle Greenhood orchids, *Pterostylis falcata*, from Vermont.

By Mr. J. G. Mann.—Fasciated branchlet of Sheoke, *Casuarina stricta*, from Frankston.

By Mr. Chas. Oke.—Thirty-nine species of Coleoptera taken on Lerderderg excursion, including thirteen species which live communal with ants—amongst these may be specially mentioned *Chlamydopsis longipes*, Lea, and *C. cctatommae*, Lea; also two rare species of ants.

By Messrs. E. E. Pescott and C. French, jun.—Herbarium specimens of fourteen species of Western Australian orchids collected by Dr. R. S. and Mrs. Rogers, including *Lyperanthus serratus*, Lindl., *Caladenia unita*, Fitz., *C. hirta*, Lindl., *C. multiclava*, Reich. f. (very rare), *C. macrostylis*, Fitz., *C. plicata*, Fitz., *C. longicauda*, Lindl., *Glossodia emarginata*, Lindl., *Drakæa glyptodon*, Fitz., *Prasophyllum hians*, Reich. f., *P. cucullatum*, Reich. f.; *P. Muelleri*, Andrews; and *Diuris Purdeyi*, Deils.

By Mr. Alfred J. Tadgell.—(A) Two forms of the Short Purple Flag, *Patersonia glauca*, Iridæ—(a) the type form has glaucous, narrow, rigid leaves, convex on both sides, with flowers almost stemless—from Sandringham; (b) a variety resembling at first glance the long-scaped Patersonia, *P. longiscapa*, with which it grew; this form (b) is very dwarf, flowers on long scapes, the leaves flat and flexile—from Oakleigh. (B) An example of arrested sap in grass flower-head, *Tetrarrhena (Ehrharta) juncea*, Wire Grass; (a) normal specimen, showing flower-head spicate and elongate; (b) distort, showing the flower-head in a broad, flattened form—from Dandenong Ranges. (C) Sensitive Trigger-plant, *Candollea (Stylidium) graminifolium*, a very tall specimen, 4 feet 2 inches high—from Dandenong Ranges.

By Mr. H. B. Williamson.—Specimens of *Pultenaea ternata*, F. v. M., Grey Bush-Pea, collected at Whitfield by Mr. Walsh; *Galium geminifolium*, F. v. M., Twin-leaf Bedstraw, collected at Kerang by Mr. E. J. Semmens; and *Rhagodia hastata*, Saloop

Salt-bush, *Rhagodia parabolica*, Mealy Salt-bush, *Calandrina volubilis*, Twining Purslane, *C. calyptrata*, Pink Purslane, *Westringia glabra*, Violet Westringia, *Carex polyantha*, Slender Sedge, collected on Lerderderg excursion.

After the usual conversazione the meeting terminated.

EXCURSION TO BENDIGO.

(Abridged.)

THE members who visited Bendigo on 11th and 12th September were favoured with pleasant weather following good rains, and the programme, therefore, was able to be carried out with complete satisfaction to all. The afternoon of Saturday was spent in a visit to the country north and west of Eaglehawk. Crossing over Lightning Hill, patches of Green Mallee, *Eucalyptus viridis*, were met with. Our first orchid was *Pterostylis nutica*. Many other flowers interested us as we made our way towards the reservoir, in the vicinity of which we found a few plants of *Boronia anemonifolia*, with the Wax-flower, *Eriostemon obovalis*. A double form of this was found later, near the Moon mine. Acacias of several species were numerous here, also the delightful little shrub, *Cryptandra amara*, as well as several other interesting plants. On the following day we visited the "Whipstick" scrub, about fifteen miles north of the city, taking the Eaglehawk road. Presently *Acacia calamifolia* made a fine show. At a hill beyond "Wallace Reef" the orchid *Glossodia major* was seen in large numbers, and associated with it were *Caladenia cœrulea*, *C. carnea*, *Pterostylis nutica*, and others. Later, the bluish foliage of *Eucalyptus polybractea*, Blue Mallee, attracted attention. This species is used extensively for the distillation of oil. Three other Mallees, *E. viridis*, *E. Behriana*, and *E. incrassata*, grew around, with three Melaleucas, *M. decussata*, *M. uncinata*, and *M. Wilsoni*, *Calythrix tetragona*, and *Leptospermum myrsinoides* forming a typical bit of "Whipstick." Many other flowering shrubs were here, also *Prostanthera coccinea* and *Grevillea lanigera*, both pale and red forms of the latter being noted. A fair number of birds were seen or heard during the day, including the Bell-bird, Bronze and Pallid Cuckoos, Yellow Robin, Harmonious Thrush, Coachwhip-bird, Butcher-bird, Rosella, and Scarlet Lory. A number of interesting "ants' nest" beetles were secured by Mr. C. Oke, as well as several species of ants.

In addition to the plants observed on the last excursion, and listed in the *Naturalist* for November last (xxxvi., p. 103), the following were noted during the excursion, mainly in the

"Whipstick." All were in flower, except those marked *o*, without flowers or buds; *b*, in bud only; and *fl*, in fruit only.

PITTOSPOREÆ— <i>b</i> Billardiera cymosa.	ARALIACEÆ— <i>b</i> Astrotricha ledifolia.
DROSERACEÆ— <i>b</i> Drosera glanduligera.	UMBELLIFERÆ— Daucus brachiatus. Hydrocotyle capillaris
RUTACEÆ— Crowea exalata. Eriostemon difformis.	SANTALACEÆ— Exocarpus stricta.
OXALIDEÆ— Oxalis corniculata.	PROTEACEÆ— Grevillea rosmarinifolia.
CASUARINEÆ— Casuarina distyla.	RUBIACEÆ— Galium australe.
SAPINDACEÆ— <i>fl</i> Dodonæa viscosa.	COMPOSITÆ— Brachycome collina. Olearia microphylla. Stuartina Muellerei. <i>b</i> Podolepis acuminata. Helichrysum adnatum.
PORTULACACEÆ— Claytonia pygmæa. calyptrata.	CAMPANULACEÆ— <i>b</i> Wahlenbergia gracilis.
SALSOLACEÆ— <i>o</i> Rhagodia nutans.	GOODENIACEÆ— Dampiera lanceolata (?). Goodenia amplexans. <i>o</i> varia.
LEGUMINOSÆ— Kennedyia prostrata. Acacia calamifolia. obliqua. <i>fl</i> lincata. <i>o</i> retinodes. sclerophylla.	LOGANIACEÆ— Logania floribunda.
CRASSULACEÆ— <i>b</i> Tillæa verticillaris.	PLANTAGINACEÆ— Plantago varia.
HALORAGÆÆ— <i>b</i> Haloragis elata	SCROPHULARINEÆ— Veronica calycina.
MYRTACEÆ— Bæckeia diffusa. <i>b</i> Leptospermum myrsinoides. <i>fl</i> Melaleuca uncinata. <i>fl</i> Wilsoni. <i>fl</i> Eucalyptus polyanthemus. <i>b, fl</i> polybractea (fruticetorum). <i>b, fl</i> incrassata. <i>b, fl</i> Behriana.	LABIATÆ— Prostanthera coccinea. <i>b</i> Westringia rigida var. grevillina.
	ORCHIDEÆ— Caladenia congesta.
	JUNCACEÆ— Juncus pauciflorus.
	CENTROLEPIDÆ— Centrolepis strigosa.

DAVID J. PATON.

WILD-FLOWER EXHIBITIONS.—Very successful exhibitions of wild-flowers have recently been held by kindred societies in Brisbane and Adelaide, at each of which Victorian flowers were exhibited. The former, held on 25th September, included, as well, a general natural history exhibition, was largely attended, and created considerable interest. The Adelaide exhibition took place on 8th and 9th October, and also included general natural history specimens. It is worthy of note that the public school at Tarcoola (East-West Railway) was placed second in the school exhibits, Sturt's Desert Pea probably being the attractive feature.

SOME INTRODUCED ANIMALS.

BY G. A. KEARTLAND.

(Read before the Field Naturalists' Club of Victoria, 9th Aug., 1920.)

WHETHER belonging to the animal or vegetable kingdom, great care should be exercised in the introduction of fresh species to a country. It is well known how the Cape Weed, Scotch Thistle, Boxthorn, St. John's Wort, Sweet Briar, and Prickly Pear have spread over large areas in the various Australian States, causing an immense amount of trouble to the man on the land, and, owing to the expense of keeping them in check, greatly reducing the returns from the areas affected.

While we grumble at the individuals responsible for the introduction of some of these botanical pests, we must also make allowance for other plants brought here accidentally as seeds in forage, or in packing with goods; but the introduction of animals or birds is quite another matter. Their importation has involved a deal of trouble as well as expense, as they required both food and attention on the way here; while the influence of our climate on the fecundity of many animals has been so remarkable as to upset all the calculations of the introducers. Here the hare has from three to five young at a birth, and frequently rears five litters in a year. In England they generally have but one. The fox usually has two cubs at a birth in Europe, and when triplets are known to occur the event is duly noted in the local press; here, six is quite a usual number of young.

Some twenty-five years ago I wrote a long letter on this subject to the Leeds Field Naturalists' Club, giving information concerning many animals and birds which had been introduced here from England. The friend to whom I entrusted it, along with some typical birds' skins, informed me, on his return, that the present was highly appreciated, but he was sure some of my statements were doubted. Were I writing that letter now I would amplify it, and supply such particulars as would satisfy the most sceptical critic.

The following statements are the result of personal observation:—

THE RABBIT.—As far back as 1852 rabbits were kept as pets by the boys of many families. They were of various colours and markings—black-and-white, all black, all white, yellow, yellow-and-white, grey, and white-and-grey; others were spotted. In my youth I had some young friends at Heidelberg who were always ready to pick out a pair of pretty young ones. These were kept in hutches for a time, but soon the boys got tired of looking after them, and they were allowed to run loose. The animals soon commenced to burrow and breed, and it was

remarked that, no matter what colour the parents were, most of the progeny were grey, so that by the time the old ones were killed off none but grey rabbits were to be seen. About 1860 efforts were made by several persons to acclimatize wild rabbits in various parts of the colony. My friend, Mr. F. G. A. Barnard, in a paper published in the *Victorian Historical Magazine* for September, 1913 (vol. iii., p. 36), quotes a paragraph from the *Richmond Australian* of 31st December, 1859, which reads as follows:—"The *Lightning* has brought an excellent addition to the live stock of the colony—viz., 66 partridges, 4 hares, and 24 wild rabbits. They are for Mr. Thomas Austin, of Barwon Park." When the paper was read a gentleman present corroborated the statement, and said he was present when the rabbits were released. I remember reading in the papers many years ago about some rabbits sent to Wood's Point in boxes on pack-horses, and a few months later the (at that time) satisfactory news that the rabbits were breeding, as several young had been seen.

That the climate agreed with the animals is evident from the fact that in a short time they became a pest, and the various Governments have been obliged to introduce legislation with the view of their suppression. Notwithstanding that millions are trapped for export and home consumption annually, they are as numerous as ever. They have spread over the whole of habitable Australia in spite of poison, droughts, birds of prey, dogs, foxes, and rabbit-proof fences. According to recent statistics, 30,000 are used for weekly consumption in one capital city alone. They commence to breed when four months old, and have as many as seven litters in a year, bringing forth from four to seven at a birth.

THE HARE.—Hares were also introduced about 1860, both by the Acclimatization Society and by private gentlemen, and were protected by Game Acts for some years. About 1870 coursing became popular, and where the owner of an estate could show that he had stocked the place with hares he had the privilege of permitting coursing. It was not till 1873 that a sportsman could shoot a hare without incurring liability to a prosecution. Now they have become so plentiful that shooting parties often kill as many as eighty in a day. While it is claimed in England that the hare has but one young one in a year, it is well known in Victoria that they breed four or five times, and have four or five at a birth. This I have proved by dissection. Last year I caught a leveret about a month old. It was kept in a pen and fed on lucerne. Three months later it was full grown. A recent price-list of Leadenhall Market in *Land and Water* quotes hares at 5s. each; here they may be bought for a shilling.

THE FOX.—About 1860 a few foxes were brought from England and liberated in order to provide game for huntsmen and hounds. I remember, as a boy, paying for the privilege of seeing a live fox in a cage. They soon multiplied at a rapid rate, and, notwithstanding that they were shot and poisoned by country residents on every possible occasion, have spread over the whole of Victoria, New South Wales, and South Australia. The fox is not only destructive to poultry and ground birds, but swims out into swamps where Swans and Wild Ducks are breeding and eats both birds and eggs. On some of the grazing areas many lambs fall victims to the rapacity of these pests. The squatters of Riverina are now paying "scalp-money" for their destruction on the same basis as has prevailed throughout Victoria for some years past. Some time ago I was informed that our Government had paid "scalp-money" on 94,000 foxes, and is still doing so. Recently a cablegram stated that 30,000 Australian fox skins realized high prices in New York, and in January of this year a sale of Australian furs was announced to take place in the same city, at which 80,000 Australian red fox skins were to be sold. Since then another sale of 40,000 Australian fox skins was held.

While in Europe the fox usually has two cubs at a birth, here they have from six to eight. In 1880 five fox burrows were dug out on a friend's place at Clayton, when thirty-two cubs were destroyed, the smallest litter being five. Last September I visited Wombelano, in the Western District, and met a young man who has been engaged trapping and killing foxes for years. He informed me he had already killed over 90 this year. On looking at the skins he had drying, I saw one litter of eight and two of seven, which had been killed in the burrows with the mother. On a station in New South Wales sixty foxes were killed last June. The remarkable manner in which the fox has spread is almost beyond belief, and in many of our mountain gullies will doubtless lead to the extermination of that prince of mimicry, the Lyre-bird.

THE CAT.—I doubt if there is any domestic animal which has adapted itself so readily to its environment as the cat. It is true that in some cases they have been turned loose on sheep stations to destroy rabbits, but it must be borne in mind that many have escaped to the shore from wrecks on our coast. The fact remains that they are now in a wild state all over Australia and on many of the islands round our coast. At King Island, Kent Group, and several other islands in Bass Strait I have seen either live cats or the skeletons. I have found them in many parts of Victoria and Riverina. At Myrniong there are many long-coated ones, which would lead to the assumption that a number of Persian cats had been

turned loose. Whilst with the Calvert Exploring Expedition in the desert of North-West Australia, in 1896, our party disturbed a fine large tabby cat from a hollow log at a place at least 400 miles from the nearest human residence; but when we reached a lagoon south of the Fitzroy River I counted the skeletons or skulls of forty-seven cats, which had probably died of thirst when the lagoon had dried up. When caught in a trap they are the most formidable animals in Australia to deal with. The natives in the North-West relish cats as food, as they are all very fat. On one occasion I shot one, and offered a lubra the choice of the cat or a pair of Wild Ducks for her dinner. She preferred the former, as it was nice and fat.

DEER.—Over sixty years ago some of our wealthy landowners kept deer in large enclosures, and whether the animals escaped or were liberated I cannot say; but they were soon seen near the Dandenong Ranges, and have since gradually spread through South Gippsland. In some districts they do damage in the orchards, but where a settler tries a crop of oats or wheat he is soon visited by these animals, and the crop suffers. Whilst on a visit to my daughter at Stradbroke, near the Ninety-Mile Beach, we heard a deer bark at night. The dog was sent after him, but he cleared the fence and escaped. In the morning the crop presented a sorry appearance, as though fifty sheep had been through it. Should deer become a nuisance in any district the Government now grants permits to kill a certain number; but even this action fails to keep the animals within reasonable limits.

The remarkable feature in connection with the animals of which I have spoken is that, although the thousands of some species have descended from a few individuals, and consequently are much in-bred, they are in most cases larger and more vigorous than the stock from which they originated.

THE WESTERN AUSTRALIAN CHRISTMAS-TREE.—In the recently-issued *Journal and Proceedings of the Royal Society of Western Australia*, vol. v., 1918-19, is an interesting paper by Mr. D. A. Herbert, B.Sc., Economic Botanist and Plant Pathologist to the Western Australian Government, in which he discusses the life-history and position of the well-known Christmas Tree, *Nuytsia floribunda*, R. Br., which has long been regarded as a doubtful parasite. A remarkable fact about the tree is that, being so very floriferous, it exhausts itself, and rarely produces seeds, while should seeds be produced they are generally infertile; but by thinning out the blossoms fertile seeds may be secured. The tree, in order to multiply itself, sends out long underground stems, sometimes as long as one hundred yards, which give off at intervals aerial branches,

usually regarded as suckers. It has always been considered as a parasite, but no definite proof of this fact seems to have been secured until Mr. Herbert started his investigations. In 1893 Baron von Mueller wrote to Mr. W. Webb, of Albany, for information regarding the tree, and his reply, published in the *Victorian Naturalist* for January, 1894 (vol. x., p. 158), is borne out by Mr. Herbert's investigations, though Mr. Webb concludes by expressing the opinion that the tree is an independent growth. Mr. Herbert shows that from the long, wandering stems of the *Nuytsia* arise branching roots, which give rise to white, fleshy roots, up to about a quarter of an inch in diameter, from which, in turn, smaller and more fragile roots extend. From these, when they come in contact with the root of some other plant (the species does not seem to matter, even garden plants being attacked), a fleshy outgrowth starts to develop, and two white fleshy arms start to grow round the attacked root in opposite directions from the point of contact, finally forming an unbroken fleshy ring round the attacked root. On the inner side of the fleshy ring arise haustoria, or suckers, and through these it is thought the *Nuytsia* obtains an additional supply of organic material, including nitrogenous substances, and can therefore be regarded as a true parasite. Whether it should be considered as a member of the Loranthaceæ, or placed in an order of its own, is a matter of opinion. The paper is well illustrated with drawings, particularly of stem and root sections, and is an excellent piece of work regarding one of the most extraordinary of Australia's many remarkable vegetable productions.

THE AUSTRAL AVIAN RECORD.—Nos. 2 and 3 (issued as one part) of vol. iv. of this publication, dated 28th July, 1920, is to hand. In it the editor, Mr. Gregory Mathews, and Mr. Tom Iredale provide an essay on "Avian Taxonomy," in which they give their reasons for a new grouping of the class Aves, which they launch as "our first attempt at providing a workable classification of avine forms." The classification commences with the order Struthioness, and concludes with the order Passeres. The minor divisions are sub-orders, super-families, and families. As may be expected, a number of changes in the names of familiar families have been made. The super-family Passeroidea is the most extensive in the list, including no less than sixty-two families, commencing with Hirundinidæ and ending with Corvidæ. Following this is "A Name-list of the Birds of New Zealand," extending to fifteen pages, classified according to the foregoing system, and giving a vernacular name for each bird. The first portion of "A Name-list of Australian Birds," extending to seven pages, concludes the part. This commences with *Dromiceius novaehollandiæ*, Emu, and concludes with *Fetula lapponica*, Barred-

rumped Godwit. A large proportion of the generic names have been altered; thus the Silver Gull (*Larus*) becomes *Bruchigavia novæ-hollandiæ*. Trinomials have been quite forgotten. A vernacular name is given for each bird, here, again, differing from current names in many cases. The well-known Muttonbird, or Short-tailed or Sooty Petrel, is now *Neonectris tenuirostris* instead of *Puffinus brevicaudus*.

SCIENCE IN NEW ZEALAND.—In 1916 there died at Nelson, New Zealand, Mr. Thomas Cawthorn, a well-known citizen of the town, who left the bulk of his estate for the establishment of a technical institute and museum. Owing to the unrest caused by the war it was not deemed advisable to take any action until the present year, when, by the addition of interest, the capital had grown to nearly £200,000. The scheme has now been set on foot, and temporary premises have been secured. A director, Prof. T. H. Easterfield, M.A., Ph.D., has been appointed, with a staff consisting of a biologist, assistant entomologist, agricultural chemist, assistant chemist, and a lady, Miss K. M. Curtis, M.A., D.Sc., as mycologist. Work will be undertaken in connection with insect pests, fungus diseases, and in other directions to stimulate production, not only in Nelson, but in the whole of the Dominion. Here is an example which might well be followed in other centres.

THE LONGEVITY OF CUT FLOWERS.—An interesting record of experiments made in this direction appears in a paper by Miss Ellinor Archer, M.Sc., in the *Proc. Royal Society of Victoria*, vol. xxxii. (new series), part 2 (issued September, 1920). The popular idea of immersing the stems in boiling water was found to be of no use. Experiments suggested that a gummy exudation which blocks up the vessels in the stems is mainly the cause of the withering. Solutions capable of dissolving the exudation were experimented with, and the conclusion arrived at that a 1 per cent. solution of lead nitrate is likely to be of most service as a preservative of cut flowers. Reports from members on this question would be appreciated.

"THE PHYSIOGRAPHY AND GEOLOGY OF THE BULLA-SYDENHAM AREA."—Such is the title of a very instructive paper by Mr. Albert V. G. James, B.A., M.Sc., in the *Proceedings of the Royal Society of Victoria*, vol. xxxii. (n. s.), part 2 (issued September, 1920). The paper is illustrated by plates, and a map which details an area of 20 square miles, and will be found extremely useful to anyone desiring to investigate the area. The well-known "organ pipes" on Jackson's Creek are situated within the area dealt with. A variety of geological formations occur, basalt being the dominant feature. At a spot on the Maribyrnong River, a little above the junction of Jackson's Creek, Eucalyptus leaf beds are noted.

The Victorian Naturalist.

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No. 445.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting was held at the Royal Society's Hall on Monday evening, 13th December, 1920.

The president, Mr. J. Gabriel, occupied the chair, and about sixty-five members and visitors were present.

CORRESPONDENCE.

From Mr. O. Römcke inviting the president and members to meet at his residence, "Norway," Woodstock-street, Canterbury, on Saturday afternoon, 18th inst., in order to inspect (under the guidance of Mr. P. R. H. St. John) the Camberwell City Council's plantation of Australian trees in an adjacent reserve. The president said that, as time was short, the committee had already accepted the invitation, and he trusted there would be good response to Mr. Römcke's invitation.

From Mrs. Helen Watts, thanking the Club for its expression of sympathy in her bereavement, and inviting members to inspect her late husband's collections of ferns, mosses, lichens, &c.

REPORTS.

A report of the excursion to the Fitzroy Gardens on Saturday, 13th November, was given by the leader, Mr. J. Stickleland, who stated that a number of pond-life enthusiasts had spent a very interesting afternoon there. Thanks were due to the curator for the facilities granted to investigate the ponds in the different enclosures. The results showed that micro-fauna and flora abounded, over fifty genera being represented. Special mention might be made of *Phacus longicaudus*, the spiral form, *Euglena spirogyra*, and *Ophrydium sessile*. Mr. J. Searle, who was interested principally in the micro-fauna, noted the Crustaceans *Bæckella asymetrica*, *B. oblonga*, *Cyclops australis*, *C. leuckarti*, *Daphnia carinata*, and *Cypridopsis minna*; also an uncommon capture, the cecaria stage of a fluke, probably of a bird. The results of this excursion, and the one last year, reported in the *Naturalist* for February last (xxxvi., p. 136), show that the gardens can provide plenty of material for the most ardent pond-hunter, while naturalists with other tastes can also find items of interest in the exotic trees and plants growing there. For instance, the fine specimen of the Maiden-hair Tree, *Ginkgo biloba*, the sole representative of its genus, family, and order, and the relic of a by-gone flora, is well worthy of inspection.

A report of the excursion to Emerald on Saturday, 20th November, was given (in the absence of the leader, Mr. W. Scott) by Mr. F. Pitcher, who said that a small party visited Emerald on that date, where they were met by Mr. Scott, who resides in the neighbourhood, and invited to his home for a cup of tea before entering on the walk along the tourist track. The Monbulk road was traversed for a little distance, and then the tourist track was entered on and followed to Paradise, where the evening train was taken for town. Though nothing of particular importance was met with, the members thoroughly enjoyed the fern scenery along Menzies Creek, parts of which are exceedingly fine and well worthy of a visit.

A report of the excursion to Beaumaris on Saturday, 11th December, was (in the absence of the leader, Mr. J. Shephard) given by Mr. W. Glance, who said that a number of members had taken part in the excursion, and, though the tide was favourable, few specimens of importance were obtained.

ELECTION OF MEMBERS.

On a ballot being taken, Miss A. and Miss L. Cruickshank, "Currajong," Auburn-road, Hawthorn; Miss Margaret A. Salter, Avondale-road, Armadale; Miss Florence Smith, "Cora Lynn," 29 Addison-street, Moonee Ponds; Mr. D. J. Chandler, Tooronga-road, Malvern; Mr. Arthur J. Graham, 104 Nicholson-street, Abbotsford; and Mr. Arthur G. Hooke, 33 John-street, Hawthorn, were duly elected as ordinary members; Mr. Chas. D'Alton, Hall's Gap, Grampians, and Rev. W. C. Tippet, Maldon, as country members; and Mr. Herbert J. V. Moore, 259 Auburn-road, Hawthorn, and Mr. Cedric R. Ralph, Finch-street north, East Malvern, as associate members of the Club.

GENERAL BUSINESS.

The president stated that the committee had decided on 4th October, 1921, as the date of the next exhibition of wild-flowers; but, on inquiry at the Town Hall, it was found that the hall was already engaged for the first two weeks of October, and that it could not be engaged, for a single day, more than three months in advance. However, he hoped that it would be possible to secure it for Tuesday, 27th September.

PAPER.

By Mr. F. Chapman, A.L.S., entitled "A Sketch of the Geological History of Australian Plants—Part III.: The Cainozoic Flora."

The author gave an interesting account, illustrated by a fine series of lantern slides, of the occurrence of evidence of a

Cainozoic flora in Australia. In Victoria leaf-beds of this age occur at Berwick, Flemington, and other places. The great deposits of brown coal at Altona and Morwell contain a great variety of vegetable remains, in which a *Callitris* (Murray Pine) figures largely. New South Wales, Queensland, South Australia, and Tasmania also supply examples which undoubtedly belong to this age.

NATURAL HISTORY NOTE.

Miss C. C. Currie, of Lardner, forwarded a note with a photograph of a remarkable occurrence of seedling tree-ferns around the stem of a Hill Tree-fern, *Alsophila australis*, about eighteen inches below the crown of fronds. The tree-fern is about fourteen feet in height, and is growing on the sheltered side of her house. She asked if any member had ever seen a similar occurrence.

Mr. F. Pitcher said that in his long experience among ferns he had never seen anything resembling the growth detailed by Miss Currie.

Mr. F. G. A. Barnard read a short extract from a letter received from a country member, Mr. D. J. Paton, who had recently visited the groups of palms, *Livistona australis*, at Cabbage-tree Creek, East Gippsland. The writer said that the palms are in good condition. He had counted over sixty specimens, some of which are well over 100 feet in height. Several were in flower, but too high up to examine properly. Many seedlings were seen and seeds picked up, so that there should be no doubt about the permanence of the patch.

In reply to a question by Mr. A. E. Keep, Mr. G. A. Keartland said that partridges have not acclimatized well in Victoria. They may have a couple of broods, but not more. On the other hand, pheasants have done well, and have to be shot over in order to control their numbers.

Mr. J. Gabriel said that on two previous occasions he had related the persistence of a pair of swallows in endeavouring to build a nest under a verandah, though it had been destroyed at least a dozen times. They had since succeeded in completing a nest in another spot and rearing a brood. Recently they resumed operations under the verandah, and worked from daybreak to about 2 p.m. When the nest was destroyed, however, another nest was built next morning.

Mr. P. C. Morrison said that a friend at Swan Hill had told him of a pair of Magpies bringing out a brood of young ones near a house, and close by a pair of Black-and-White Fantails had also brought out a brood. The Fantails had so harassed the Magpies when feeding their young that after a week the Magpies gave up the task, and allowed their young to die.

Referring to a paragraph in the December *Naturalist*, Mr. E. E. Pescott, F.L.S., said that flowering dahlias, Iceland poppies, and wattles can undoubtedly be freshened up by placing the stems in hot water.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Specimens of *Pultenaea Wcin-dorferi*, Reader, from Nar Nar Goon—an unrecorded locality for this plant.

By Mr. A. N. Burns.—Thirty-three species of butterflies from Ferntree Gully district, including the following rare species:—*Papilio sthenelus*, Orange Swallow-tail, *Miletus delicia*, Moonlight Blue, and *Pseudalmenus chlorinda*.

By Miss C. C. Currie.—Photograph of Tree-fern, *Alsophila australis*, showing growth of seedlings just below the crown of fronds.

By Dr. P. T. Justesen.—Photographs of *Rafflesia Arnoldi*, taken in Sumatra, including growing buds and flowers and vertical and horizontal sections through the bud.

By Mr. E. E. Pescott, F.L.S., and Mr. C. French, jun.—Herbarium specimens of orchids—*Prasophyllum Braincanum*, Rogers (new species), from Ringwood, with *P. fuscum* for comparison; *P. Frenchii*, F. v. M., from Ringwood; *P. flavum*, R. Br., from Stawell (new locality); *Thelymitra fusco-lulca*, R. Br., from French Island (new locality); *Pterostylis*, sp., new unnamed species from Dandenong Ranges; photographs of *Diuris alba*, R. Br., by Mr. W. H. Nicholls; and living plants of Crow Orchid, *Orthoceras strictum*, R. Br., from Mr. J. A. Hill, Stawell.

By Mr. F. Pitcher.—Specimen of grass, *Glyceria dives*, "Wild Oats," ten feet high, from tourist track, Menzies Creek.

By Mr. P. R. H. St. John.—Herbarium specimens of two double-flowered specimens of Austral Blue-bell, *Wahlenbergia gracilis* (N.O. Campanulacæ), collected by Rev. Alex. Macallan at Lake Rowan, November, 1920.

By Mr. A. J. Tadgell.—Seven swamp plants collected at Oakleigh, 11th December, 1920:—Swamp Mazus, *Mazus pumilio* (N.O. Scrophularinæ); Tall Flowering Rush, *Nyris operculata*; Forked Sundew, *Drosera binata*, quite a striking plant when in flower; Tiny Sundew, *D. pygmaea*; Spoon-leaved Sundew, *D. spathulata*; also the two Selaginellas—*S. Preissiana*, Preiss's Club Moss (annual) and *S. uliginosa*, Swamp Club Moss (perennial).

By Mr. H. B. Williamson.—Eggs of Mutton-bird or Short-tailed Petrel, taken at Cape Woolamai.

After the usual conversazione the meeting terminated.

ON FOUR ORCHIDS NEW FOR VICTORIA.

BY E. E. PESCOTT, F.L.S., and C. FRENCH, JUN.

(Read before the Field Naturalists' Club of Victoria, 11th Oct., 1920.)

It is the intention of Dr. R. S. Rogers, M.A., the well-known orchidologist of Adelaide, to place on record, in the *Proceedings of the Royal Society of South Australia*, four orchids new for Victoria, two of which are new to science.

Caladenia iridescens, Rogers, n. sp.—This orchid was collected by one of us (E. E. P.) on the rocky slopes of the hills close to the Splitters' Falls, in the Grampians, in October, 1913. Specimens were sent to Dr. Rogers, who laid them aside for mature consideration. In structure the orchid is not unlike *C. congesta*, but it is much more slender, and the colour is a beautifully iridescent red-bronze. Specimens were collected in the Grampians a few days later by Mr. J. W. Audas, F.L.S. The specific name has reference to the iridescence of the flower, and the vernacular name suggested is "Bronzy *Caladenia*."

Caladenia alba, R. Br.—This orchid was described by Robert Brown, and is figured by Fitzgerald in his "Australian Orchids." It must not be confused with the albino form of *Caladenia carnea*, which is fairly common. The arrangement of the petals and sepals is similar to that of *C. carnea* in that two sepals and the two petals stand out like four outstretched fingers, while the dorsal sepal stands up above the column, but not as a hood. The colour is pure white, with a suggestion of heliotrope, while the flower is quite as large, if not larger, than *Glossodia major*. Three specimens were found at the end of September last, on the slopes of Mount Dandenong, by Master Jack French. The specimens were not in close proximity, but were far removed from each other. The common name suggested is "White *Caladenia*."

Caladenia cordiformis, Rogers, n. sp.—Last year we received from Western Australia specimens of von Mueller's *Caladenia Cairnsiana*. These specimens differed in so many ways from the accepted Victorian specimens that reference was made to the "Flora Australiensis" and to the "Fragmenta Phytographiae Australie" for confirmation. We then found that the western specimens agreed with the published description, but that the generally accepted Victorian specimens of *C. Cairnsiana* certainly did not. It was too late in the season to send fresh specimens of *C. Cairnsiana* to Adelaide; dried specimens were sent, and this season an ample supply of fresh flowers was forwarded to Dr. Rogers. Dr. Rogers has decided that this orchid is

certainly not *C. Cairnsiana*, and that it does not conform to any published description of a *Caladenia*; so that the orchid which has been masquerading in Victoria for over thirty years as *C. Cairnsiana* becomes *C. cordiformis*, and the former orchid must be dropped from our records. It is purely a western species. The specific name refers to the heart-shaped labellum, and the common name proposed is "Heart-lipped *Caladenia*."

It may not be out of place to here briefly show some of the main superficial differences between the two species:—

CALADENIA CAIRNSIANA, F. v. M. CALADENIA CORDIFORMIS, Rogers.
(See "Fl. Aust.," vii., 31.)

- | | |
|---|--|
| 1. Leaf linear. | 1. Leaf broad linear and very hairy. |
| 2. Sepals and petals narrow linear, 5 lines long, not produced into points. | 2. Sepals and petals broad linear, 1 inch long, produced to points which are often distinctively clavate. |
| 3. Labellum about as long as the sepals. | 3. Labellum only half the length of the petals and sepals. |
| 4. Labellum consisting chiefly of the broad lateral lobes elegantly marked with deep purple diverging simple or forked veins. | 4. No vein markings on the labellum, which is incurved at the tip, and blunt, the tip being dark-coloured and callous. |

Caladenia cardiophila, Tate. —An orchid was described by Professor Tate in the *Proceedings of the Royal Society of South Australia* in 1887 under the name of *Caladenia cardiophila*. Tate's coloured drawing of this species was published in the *Proceedings of the Royal Society of Victoria* in Professor Ewart's "Contribution to the Flora of Australia," vol. xviii. (1916). This orchid was considered by some authorities to be too close to *C. Cairnsiana* to be given specific rank, and the name was subsequently dropped in favour of the Western species.

Dr. Rogers has now decided that *C. Cairnsiana* is purely a Western plant, and that *C. cardiophila* must stand as a South Australian species. We have seen one Victorian specimen of *C. cardiophila* from the herbarium of H. B. Williamson, collected at Grantville by Wm. Wallace. As this orchid has been collected at Border Town by Dr. Rogers, it is quite possible that it will in the future be recorded from our Mallee district. The vernacular name suggested is "Fleshy-lipped *Caladenia*." The photo-engraving which is "fig. 1" (*Caladenia Cairnsiana*) in Dr. Rogers's book on South Australian orchids now becomes *C. cardiophila*. The fleshiness of the labellum, as well as the vein markings, are clearly shown in this engraving.

PLATE 4.

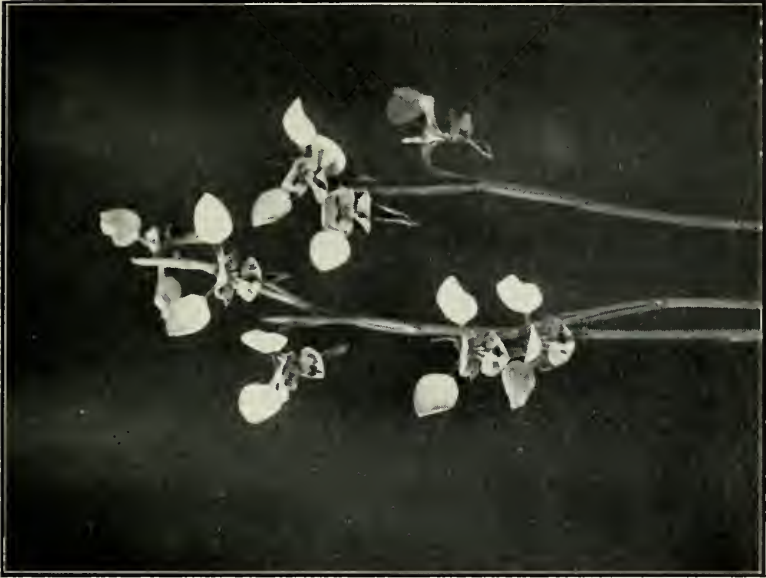


FIG. 2.—BROAD-LIPPED DIURIS, *DIURIS PALACHILLA*,
ROGERS.



FIG. 1.—BLOTCHED SUN ORCHID, *THELYMITRA*
FUSCO-LUTEA, R. BR.
Negatives by E. E. PESCOFF.

PLATE 5.



FIG. 4.—ELBOW ORCHID, *DRAKEA HUNTIANA*, F. V. M.

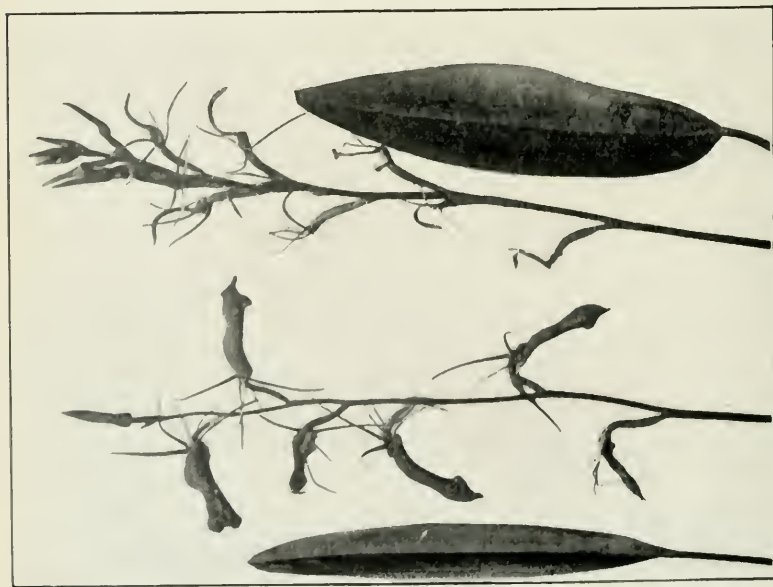


FIG. 3.—LARGE TONGUE ORCHID (left), *CRYPTOSTYLIS LONGIFOLIA*, F. BR.; SMALL TONGUE ORCHID (right), *CRYPTOSTYLIS LEPTOCHILA*, F. V. M.
Negatives by E. E. PESCOFF.

NOTES ON THE ORCHIDS OF VICTORIA.

BY E. E. PESCOTT, F.L.S., F.R.H.S.

(Read before the Field Naturalists' Club of Victoria. 11th Oct., 1920.)

HISTORICAL.—Apart from the purely botanical accounts and descriptions of our orchids which appeared in early botanical works, the first collected record of Victorian orchids appeared in the early pages of the *Victorian Naturalist* from the pen of that well-known naturalist and orchid enthusiast, Charles French, sen., the father of our Club. The first article appeared in vol. i., No. 1 (January, 1884), and the twelfth in vol. iv., No. 4 (August, 1887). Short articles had appeared from time to time prior to this in the *Southern Science Record* and other journals from the pens of Baron von Mueller, J. M'Kibbin, and others.

In his excellent series of articles French gave an account of seventy-five species which, up to that time, had been collected in this State, supplementing his account with records and instructions for the growing of these orchids—a phase of work in which he excelled when at the Melbourne Botanic Gardens. He recorded seventy-five species, three of which were epiphytes.

In Mueller's "Key to the System of Victorian Plants" (1888) seventy-eight species are listed, three of which are epiphytes. From this list one species (*Pterostylis aphylla*) must be omitted, leaving seventy-seven species known to 1888.

In the *Victorian Naturalist* for June, 1895, Charles French, jun., published "Observations on the Flowering Times and Habitats of Some Victorian Orchids," in which he lists about eighty species and varieties. The list is not complete, but gives the names and localities of all the species which that indefatigable collector had noted.

Von Mueller's first "Census of Australian Plants," published in 1882, gives a list of seventy-three species, and the second edition, published in 1889, lists eighty-two species.

The Plant Names Committee, which was appointed by this Club to prepare a vernacular list of native plants, issued its first list in July, 1911, in the *Victorian Journal of Agriculture*. Here ninety-four species were listed, having, for the first time, common names attached. Four species were subsequently removed from this list, two being recorded in error (*Prasophyllum Reichenbachii* and *Caladenia discoidea*), one (*Pterostylis Mackibbini*) having been described as a synonym, and one (*C. Cairnsiana*) being erroneously named.

Thus progress was being made in the discovery of new species as the years passed; and it is worth recording that the discovery of a considerable number of these new species was due mainly to the good work of Charles French, jun.

Since 1911 very considerable interest has been taken in the study and observation of our orchids, and at the present time we have a knowledge of 123 species in this State—an increase of thirty-three species since 1911.

The most interesting and popular account of our orchids that has yet been written appeared as a series of articles entitled "The Quest of Orchids" in the columns of *The Federal Standard*, published at Chiltern, during the years 1917-18. Twenty-two articles were written, describing the collecting and observations extending through the year, and the author records the finding of fifty-three species within a radius of ten miles from his school at Cravensville, near Tallangatta, in the North-Eastern district. To this fine collector, Mr. Arthur B. Braine, stands the record of having collected some of our rarest orchids, one of which was new to science and three new for the State.

COLOUR AS A GUIDE TO SPECIES.—As a general rule, the colour of an individual species is strictly constant, and the general colour can be taken as a guide to the species. Thus, if we find a purple *Diuris* we can almost safely conclude that it will be *D. punctata*; or if we find a blue *Caladenia* we may take it to be *C. deformis* or *C. cærulea*. But that is not invariably the case, for frequently colour varieties will be found within the species. Albino forms, too, are known of many species. A pure white specimen of the Hyacinth Orchid, *Dipodium punctatum*, was found a few years ago at Ararat. White varieties of several species of *Thelymitra* and *Caladenia* are known, and also of *Glossodia major*. A specimen of *Pterostylis falcata*, almost pure white in foliage, stem, and flower, was recently found at Dandenong Creek; while a member of the Club, Mr. A. J. Tadgell, found a clear yellow variety of *Caladenia deformis*. Purple and purplish varieties of both *Diuris longifolia* and *D. maculata* are known. The Crow Orchid, *Orthoceras strictum*, is found in both dark purple and green forms. Green varieties of *Chiloglottis trapeziforme*, *C. Gunnii*, *Acianthus caudatus*, and *Cyrtostylis reniformis* have also occurred. A red variety of *Thelymitra antennifera* is also well known. What seems to be an extreme limit in colour variation was the finding last year by Dr. R. S. Rogers—not in this State, but in Western Australia—of a pure white flower of *Lyperanthus nigricans*! So that emphasis must be laid on the fact that it is the structural form, and not the colour of the flower, that determines the species.

NEW SPECIES RECORDED SINCE 1911.—The following are the species and localities of the new records, so far as these data are available:—

Thelymitra venosa, R. Br., the Veined Sun Orchid, collected

on the Baw Baw Ranges by C. French, jun. The veinings on the sepals and petals are very marked. Illustrated in Dr. Rogers's "South Australian Orchids," p. 37.

Thelymitra pauciflora, R. Br., the Slender Sun Orchid, recorded from Bittern, Sandringham, Cheltenham, and Ringwood. The flowers are pale, and often white. There are usually fewer flowers in the Victorian specimens than are shown at page 9 of Dr. Rogers's book.

Thelymitra canaliculata, R. Br., the Pale Sun Orchid. A slender species from Tallangatta and South Gippsland.

Thelymitra grandiflora, Fitz., the Great Sun Orchid, recorded from Ocean Grove, Paywit, Moorooduc, Marcus Hill, and Ringwood. This is the largest of the genus, having several large, thick leaves and stems three feet or more high, with thirty to forty bright blue flowers. Illustrated in colours as a frontispiece to Dr. Rogers's book.

Thelymitra luteo-cilium, Fitz., the Red Sun Orchid, has been found by J. A. Hill at Golton, near Mount Zero, and also at Baxter, near Langwarrin. The flowers are dark red in colour, the plant is robust, and the seed-pods are exceptionally large. This orchid was considered for many years to be *Thelymitra Macmillani*, F. v. M., the Salmon Sun Orchid. The latter is a dainty, slender plant, of lighter red, and is recorded from Mount Martha, the Grampians, and Maryborough.

Diuris palachila, Rogers, the Broad-lipped Diuris, has often been taken for a yellow form of *Diuris maculata*. The broad spade shape of the labellum is a ready guide to the species. It is recorded from Ringwood, Sandringham, Cheltenham, and Diamond Creek. It is possibly widespread. An illustration is found at page 29 of Dr. Rogers's book. See fig. 2.

Calochilus cupreus, Rogers, Copper Beards.—This striking coppery-coloured bearded orchid is only recorded from two Australian localities—M'Laren Vale in South Australia and the Grampians in Victoria—the collector of the Victorian specimens being J. W. Audas, F.L.S.

Prasophyllum Suttoni, Rogers and Rees, the Alpine Leek Orchid, a slender white and green species, collected by Dr. C. S. Sutton on the Buffalo Plateau in 1902. It has since been collected by other workers.

Prasophyllum flavum, R. Br., the Yellow Leek Orchid.—An interesting leafless species with thick, tuberous roots, collected by C. French, jun., on the Baw Baws; by A. B. Braine, at Cravensville; and by J. A. Hill, at Stawell.

Prasophyllum album, Rogers, the White Leek Orchid.—A pretty, compact, white-labellum flower from Ringwood, Langwarrin, Somerville, and similar localities. Sometimes the labellum is beautifully pink.

Prasophyllum odoratum, Rogers, the Sweet Leek Orchid.—Not unlike the latter superficially, except that the petals and sepals are longer, and the flowers more distant on the spike. It comes from Ringwood; but possibly this and the former species are widespread, and may have been taken for *Prasophyllum patens*.

Prasophyllum ciliatum, Ewart and Rees, the Hairy Leek Orchid.—Collected at Green Valley, near Talbot, by F. M. Reader in 1910. This is a small June-flowering species, with a hairy, fringed labellum. It is only about five or six inches in height, and is rare.

Pterostylis falcata, Rogers, the Sickie Greenhood.—Has long been wrongly known as *P. cucullata*. The latter is a low-growing species, while the Sickie Greenhood is tall, often a foot in height. The flower is very large, with occasionally purplish shadings. It is found from October to December in moist localities in many parts of the State.

Pterostylis alpina, Rogers, the Alpine Greenhood, was for many years looked upon as a small variety of the previously-mentioned Greenhood. It flowers somewhat earlier, the flowers are smaller, and it is recorded from many localities.

Pterostylis revoluta, R. Br., the Autumn Greenhood, was bracketed for many years with *P. reflexa*. It flowers in autumn. The flower is fairly large and dainty in appearance, green and purplish streaked, with a slender and almost leafless stem. This is one of our daintiest and most striking Greenhoods. It was first recorded from Cravensville by A. B. Braine, and is generally a mountain plant.

Pterostylis Toveyana, Ewart, the Mentone Greenhood.—This was collected at Mentone by J. R. Tovey. It is a June orchid, and is possibly a hybrid between *P. reflexa* and *P. concinna*. It is quite small, with stem leaves. The labellum is distinctly notched (bifid) on the top, but not quite so deeply as that of *P. concinna*.

Pterostylis Mitchelli, Lindl., and *Pterostylis pusilla*, Rogers.—These two belong to the *P. rufa*, R. Br., group, all of which are more or less marked with a rusty-red colour. *P. rufa* has the rosette of leaves withered at flowering time; the labellum is membranous. *P. Mitchelli* has a green rosette of leaves at flowering time and a fleshy labellum. The flowers of both species are large. *P. pusilla* has very diminutive flowers, the leaf rosette being green at flowering time, and the labellum membranous.

Drakaea Huntiana, F. v. M., the Elbow Orchid.—A notable find of A. B. Braine at Cravensville. This diminutive orchid only has another locality—at Mount Tingiringi, in New South Wales. It is only two or three inches in height, and the illustration herewith depicts its unique form. See fig. 4.

Caladenia leptochila, Fitz., the Narrow-lipped *Caladenia*, is only recorded from Kewell by J. A. Hill. The narrow labellum is "probably the flattest labellum in the genus." It is dark red-brown, having four rows of calli.

Caladenia dilatata, R. Br., was for years grouped with *C. Patersoni*. It is a distinct and well-known species.

Caladenia clavigera, Cunn., the Clubbed Spider Orchid, is recorded from Alexandra and from South Gippsland. It is often confused with *C. Patersoni*. The sepals and petals are distinctly clubbed at the ends.

Caladenia tentaculata, Tate, "Daddy Longlegs," is only recorded from Sea Lake and similar Mallee localities. The petals and sepals are very long and narrow, and the labellum is small.

Caladenia testacea, R. Br., Musky *Caladenia*, was for years grouped with *C. carnea*. It is a slender plant, the dorsal sepal being dark red and hooded and having a strong musky odour.

Caladenia angustata, Hook., the Slender *Caladenia*, is a slender, very long-leaved species, not unlike *C. carnea*; only recorded from the Nhill district and the Grampians.

Caladenia cucullata, Fitz., the Hooded *Caladenia*, was collected by C. French, jun., on the Baw Baws. It is like an enlarged *C. carnea*, with a distinctly hooded dorsal sepal. The petals and sepals are wider than those of *C. carnea*. Dried specimens of this and the former species were found in the herbarium of Mr. H. B. Williamson, where they were considered to be forms of *Caladenia carnea*.

Caladenia alba, R. Br., *C. iridescens*, Rogers, *C. cardiochila*, Tate, and *C. cordiformis*, Rogers, are described in another paper.*

Chiloglottis Muelleri, F. v. M., the Green Bird Orchid, was confused for years with *C. Gunnii*, being considered a green form of this latter. The flowers are green, smaller than those of *C. Gunnii*, and the plants are invariably found growing on tree-fern stumps. The locality is the Dandenong Ranges.

Chiloglottis trapeziforme, Fitz., the Broad-lipped Bird Orchid, is only recorded from Cravensville. The labellum is rhomboid, and the flowers slender and small.

Chiloglottis Pescottiana, Rogers, the Alpine Bird Orchid, also is only found at Cravensville. Both of these species were recorded by A. B. Braine. The flowers are greenish-bronze, and the labellum more oblong and slightly pointed. Both species flower in spring.

* "On Four Orchids New for Victoria," by E. E. Pescott, F.L.S., and C. French, jun., *Vict. Nat.*, vol. xxxvii., No. 9, p. 107.

BLOTCHED SUN ORCHID, *Thelymitra fusco-lutea*, R. Br.—The finding of this orchid last month at French Island by Capt. the Rev. A. C. F. Gates, M.A., constitutes one of the most interesting and unique "finds" in our orchid records. The "Blotched Sun Orchid" is essentially a western plant, with several localities in South Australia. Some years ago a single specimen was collected at the Grampians by the late Charles Walter, and later by various collectors near the entrance to the Grand Canyon. Now that it has been found to have strayed as far south and east as French Island, we may look for it anywhere in the State. Its inconspicuous colour (green-yellow and brown blotched) so harmonizes with the grasses and low herbage that it may readily have been overlooked in many localities, especially as it only opens in the sun, and also as it is a late-flowering species. The single leaf, too, is not unlike that of the "Streaked Lyperanth," *Lyperanthus nigricans*, so that, when not in flower, it may pass for that plant (see fig. 1).—E. E. PEScott.

MILITARY MAP OF YAN YEAN.—The issue of the "Yan Yeau" sheet of the Commonwealth Survey of Victoria fills up the north-eastern corner of the four sheets containing Melbourne and suburbs. Like its southern neighbour, "Ringwood," it includes a large area of picturesque country, some of it, spurs of the Plenty Ranges, being fairly steep, as indicated by the contour lines. It includes a portion of the Dividing Range in the neighbourhood of Toolangi. Though stated to be corrected to December, 1919, there are several minor additions that might have been made. The map embraces the area from Whittlesea to Lilydale and Toolangi to Preston. It is rather a pity that a uniform style of drawing has not been adhered to in these maps. This one depicts the railways in quite a different style to the earlier ones, and the roads and rivers are also drawn wider than before. Though 37° 5' S. is the southern boundary of this map, and the northern of Ringwood, intersecting streams and roads do not coincide—at least half a mile of country seems to have been omitted between the two maps. Like all other commodities just now, the price has been advanced, to 1s. 6d. per copy.

The Victorian Naturalist.

VOL. XXXVII.—No. 10. FEBRUARY 10, 1921.

No. 446.

FIELD NATURALISTS' CLUB OF VICTORIA.

OWING to traffic restrictions consequent on coal shortage, caused by shipping stoppage, the January meeting of the Club was not held.

A SKETCH OF THE GEOLOGICAL HISTORY OF AUSTRALIAN PLANTS: THE CAINOZOIC FLORA.

BY FREDERICK CHAPMAN, A.L.S., &c., Palæontologist to the National Museum, Melbourne.

(With three plates.)

(Read before the Field Naturalists' Club of Victoria, 13th Dec., 1920.)

As already mentioned in a former paper of this series,* evidence has been obtained from the Queensland Mesozoic flora of leaf-remains, which are clearly of dicotyledonous affinities. These remains are as old as the Neocomian stage of the Lower Cretaceous, and they show some relationships to the Waikato Head flora of New Zealand.† Had we no evidence other than that of the fossil flora to show a great *time-break* between the youngest Australian Cretaceous beds and the succeeding Tertiaries, that would alone suffice to emphasize the fact, for the oldest Tertiary or Cainozoic deposits contain quite an advanced type of angiospermous plant-remains. The unfilled gap must be enormous as regards time, and, as it is inconceivable that no deposits were formed during that period, we are compelled to resort to the idea that subsequent erosion and weathering, in other words pene-planation, is responsible for their entire absence from the Australian region.

Upper Oligocene.—The earliest definite horizon in the Cainozoic system in which plant remains are found is the Balcombian. This series can be regarded as equivalent to the Aquitanian (Oligocene of some authors, Lower Miocene of others). At Altona Bay and Newport, shafts were sunk some years ago to obtain brown coal. This was obtained at depths of 347 feet 11 inches in bore 2, parish of Truganina, sec. vii.: at 355 feet 8 inches, at 362 feet 7 inches (seam 29 feet thick), at 393 feet (seam 42 feet thick), at 435 feet (seam 13 feet thick), and at 448 feet (seam 40 feet thick), parish of Truganina, sec. iv., bore No. 3. In the last-named bore a blue clay containing shells with a Balcombian aspect, and having a thickness

* *Victorian Naturalist*, vol. xxxv., No. 10, 1919, p. 156.

† "Mesozoic Floras of Queensland," parts 3 and 4, *Queensland Geol. Surv. Publ.*, No. 263, 1919, p. 252.

of 180 feet, overlaid the various seams of brown coal and sand, and therefore the lignite is either Balcombian or older—at least Oligocene or Eocene. From one of these bores at about 345 feet a specimen of fossil (lignified) wood was obtained by Mr. W. J. Parr. Upon an examination of thin slices of this and other woods from the Altona Bay coal-shaft, I found them to belong to the same type as Seward's genus *Mesembrioxylon*.* They are also almost identical with Schenk's "*Phyllocladus*" *Muelleri* from the Deep Leads of Victoria,† the wood structure of which recalls that of *Callitris*. This affinity of the early Tertiary woods to the timber still forming part of the forest land of Victoria and Australia generally, is of very great interest from the point of view of the persistence of a coniferous type over a vast period.

Queensland Fossil Wood.—Other fossil woods of the genus *Mesembrioxylon* (*M. fluviatile* and *M. fusiforme*) have lately been described from Tertiary deposits containing bones of *Diprotodon*, close to the Condamine River, and west of Chinchilla station, on the Western Railway line, beyond Toowoomba. It is, of course, extremely probable that the fossil wood may have belonged to an older Tertiary bed than that in which it is now found. The author of the two species mentioned, Prof. Birbal Sahni,‡ also describes two species of angiospermous woods from the Tertiary of Queensland under the new genus name of *Pataloxylon*; these are of a specialized type resembling modern genera, of which eight living families are specified.

Victorian Miocene Leaf-Beds.—Underlying the Older Basalt in Victoria are certain leaf-bearing beds consisting of ferruginous consolidated silt occurring in the highlands of the Bogong and Dargo districts; and also beds of pipeclay in the Berwick and Flemington areas having the same relation to the Older Basalt. The age of the Older Basalt of Victoria is practically fixed for the generality of occurrences by its intercalation between Miocene (Janjukian) limestone in the Moorabool Valley, whilst at Flemington and Flinders the Miocene marine beds rest on its eroded surface. Those leaf-bearing beds, therefore, which are found under the basalt are Miocene or earlier. That they can hardly be of Eocene age is seen from the fairly modern type of *Eucalyptus* leaves mingled with the more archaic forms. The inference may therefore be drawn that they are of Miocene age—possibly Lower—and therefore not far removed from the lignite beds of the Altona Bay boring.

The Berwick Flora.—One of the most important assemblages

* "Fossil Plants" vol. IV., 1919, pp. 173 and 203.

† See Schimper and Schenk, "Traité de Paléophytologie," 1891, p. 864.

‡ Queensland Geol. Surv. Publ. No. 267, 1920.

of fossil leaves of the Older Tertiary series is that found under the floor of Wilson's bluestone quarry at Berwick, Gippsland. These leaf-bearing beds are described by A. E. Kitson as "yellow, white, black, and brown soft clays and sandy clays, some of them containing leaves of dicotyledonous plants in great abundance."* Mr. Henry Deane has described the Geological Survey collection of leaves from this locality,† and remarks that "a large number of the leaves from these deposits have all the appearance of eucalypts, and that they belong to the genus *Eucalyptus* as we know it, and not merely to some ancestral form, is highly probable." Many of these leaves belong to the *Proteaceæ*, and altogether the assemblage, as Mr. Deane says, is "as typically Australian as that of any district at the present day." The following genera from this locality have been determined by Mr. Deane:—

- Family TILIACEÆ.—Genus *Aristotelia*.
- „ STERCULIACEÆ.—Genus *Commerconia*.
- „ SAPINDACEÆ.—Genus *Nephelites*.
- „ MYRTACEÆ.—Genera *Tristanites*, *Eucalyptus*.
- „ APOCYNACEÆ.—Genus *Apocynophyllum*.
- „ MONIMIACEÆ.—Genera *Atherosperma*, *Mollinedia*,
Hedycarya, and *Daphnandra*.
- „ PROTEACEÆ.—Genus *Lomatia*.
- „ CUPULIFERÆ.—Genus *Fagus*.

Mr. Deane and I recently visited this quarry, on which occasion we found a good series of specimens, amongst which were the genera *Lomatia*, *Nephelites*, *Eucalyptus*, and *Tristanites*, and also a fragment of a fern. The exposure is rather difficult of access, but the results of a little work are always good, as the fossils are very abundant. By the almost equal proportion of *Eucalyptus* leaves of the wide-angled, parallel-veined (archaic) type and those in which the veins are acutely disposed to the midrib, one cannot help concluding that the flora is somewhere in the mid-stage development, and precludes the idea of one so old even as the Eocene.

Flora of the High Plains.—The river silts and ferruginous deposits of the Dargo High Plains, already mentioned, have been elevated to between 4,000 and 5,000 feet above sea-level. Underneath the Older Basalt flows at Bogong are found these old fluviatile beds whose waters formerly ran south, but where now the drainage is directed to the Murray. They apparently belonged to the oldest part of the Deep Leads system. The included leaf-remains are referred by McCoy‡ to *Lastræa*

* Rec. Geol. Surv. Vict., vol. i., part 1, 1902, p. 55.

† *Tom. cit.*, pp. 21–32, pls. iii.–vii.

‡ Prog. Rep. No. 5, Geol. Surv. Vict., 1878, p. 175.

dargoensis, "*Salisburia*" (*Ginkgo*) *Murrayana*, and "*Tæniopteris*" *tenuinervis*. The latter is undoubtedly a eucalypt of the wide-angled and parallel type of venation. The probable identity in age of these elevated Tertiary leaf-bearing beds with others nearer the present coastal plain, such as that of Berwick, Bacchus Marsh, and Narracan, is strongly supported by McCoy's record* of leaves of *Cinnamomum polymorphoides* and *Laurus werribeensis* in the alluvials of the Dargo High Plains, where he also found a fossil leaf which, he says, is "apparently referable to the *Ficus dionysia* of Massalongo from the South European Miocene beds."†

Besides *Cinnamomum polymorphoides* and *Laurus werribeensis*, McCoy notes "possibly *Acer*"‡ from the Bacchus Marsh series. This is apparently a leaf of the aceriform *Sterculia*, or Flame-tree, a genus already noted by Mr. Deane from Pitfield Plains.

Narracan, Pitfield, Sentinel Rock, and Mornington.—At Narracan, in South Gippsland, a fine, sandy, plant-bearing bed with leaf remains rests on a denuded surface of Jurassic sandstone. This leaf-bed is closely related in its flora to that of Berwick, Bacchus Marsh, and other Victorian localities, making allowances for differences of topography, for it contains *Ficonium Solanderi*, Ett., a species recorded from Gunning, New South Wales; *Hedycarya*, cf. *latifolia*, Deane, from Berwick; *Cinnamomum polymorphoides*, McCoy, from Bacchus Marsh, Dargo, Pitfield, and at Gunning and Vegetable Creek, New South Wales; *Sterculia*, sp.; *Eucalyptus*, aff. *Kilsoni*, Deane, from Berwick; and *Tristanites angustifolia*, Deane, also previously found at Berwick.

The Pitfield flora was obtained from a bore at the Glenfine Extended Co. at Pitfield Plains, from a depth of 100 feet, the bore passing through two distinct layers of basalt and resting on basalt. Mr. Deane states that "the leaves indicate a vegetation of the 'brush' type."§ The list from this locality includes *Sterculia Muelleri*, Deane, (?) *Drimys*, sp., *Nephelites Ulrichi*, Deane, *Mollinedia Muelleri*, Deane, *Daphnandra Schweyni*, Deane, *Cinnamomum polymorphoides*, McCoy, *Argophyllites parvifolia*, Deane, *Eucryphia Gregorii*, Deane, *Panacites Howitti*, Deane, *Pittosporum præundulatum*, Deane, and *Carpolithes acaciaformis*, Deane. The absence of *Eucalyptus* is especially noticeable, bearing out Mr. Deane's conclusions of the type of flora represented.

The flora of Sentinel Rock is a very distinct one,|| the leaves

* *Loc. supra cit.*, p. 176.

† Also on p. 176.

‡ *Prog. Rep. Geol. Surv. Vict.*, vol. II., 1874, p. 24.

§ *Rec. Geol. Surv. Vict.*, vol. I., part 1, 1902, p. 15.

|| *Rec. Geol. Surv. Vict.*, vol. I., part 3, 1904, p. 212.

being chiefly of the *Coprosma* type (*Coprosmaephyllum*, Deane). Other genera present are the proteaceous *Persoonia* (Geebung), the coniferous *Phyllocladus*, and a fragment of a fern frond. *Casuarina* and *Acacia* are also represented. The stratigraphical relationships of this bed are clearly with the Janjukian or Miocene, and somewhat near the base of the series.

Mr. Deane has described a branch with leaves, from Mornington, under the name of *Eucalyptus præcoriacea*.* Fossil leaves are fairly abundant in several outcrops south of Mornington, and the following genera, amongst others, have been noticed by Mr. R. A. Keble and myself:—*Nephelites*, *Tristanites*, (?) *Eucalyptus*, *Apocynophyllum*, *Mollinedia*, and *Lomatia*. This assemblage has a close affinity to the Berwick flora, although the sediments in which they are preserved are somewhat different, the latter being more argillaceous or less sandy.

The Morwell Brown Coal.—In the Alberton and Latrobe Valley areas there are immense thicknesses of this accumulation of forest *débris*, one of the seams exceeding 800 feet in thickness. The catchment area for the rafts of timber pouring down from the storm-riven forests of the highlands was continually sinking under the superimposed weight. A curious point requiring explanation is the purity of the deposit, and we can only conjecture that the silt and gravel was dropped before reaching the main area of deposition. From an examination of many samples of the wood from the Morwell brown coal, I have elsewhere shown in a report submitted to the Victorian Geological Survey (but not yet published), that the wood is referable to the Cypress type of structure, and by comparison is almost identical with the *Callitris cupressiformis*, Ventenat, or Mountain Cypress Pine, still abundant in Victoria. The age of this deposit is not absolutely certain, but from comparative palæogeographical evidence it seems not improbable that the great subsidences involved in the formation of the deposits were contemporaneous with the crustal oscillations which played so important a part in the building of the Miocene strata of Victoria; and we may assume that, whilst the higher level river valleys were filled with lava, the extensive erosion taking place near the coast caused a sagging of the coastline and consequent accumulation of *débris* and vegetable matter.

(To be continued.)

ORCHIDS.—The *Gum Tree* for December contains a chatty article by Miss Edith Coleman, of Blackburn, entitled "Forest Orchids," in which a number of our orchids are briefly described, while the Misses Dorothy and Gladys Coleman have contributed drawings of many of the species mentioned, unfortunately without much regard to proportion.

* *Ibid.*, vol. i., part 1, 1902, p. 20.

THE NECESSITY FOR AN IMMEDIATE AND CO-ORDINATED INVESTIGATION INTO THE LAND AND FRESH-WATER FAUNA OF AUSTRALIA AND TASMANIA.

BY SIR BALDWIN SPENCER, K.C.M.G., F.R.S., D.Sc.

THE matter of the investigation of the land and fresh-water fauna of Australia is one of pressing importance. From the purely taxonomic point of view the botanic record is probably more complete and satisfactory than the zoological. It is much more easy to collect and study plants than animals. The former cannot get out of your way, while it is a primary instinct of the latter to do so. It is very significant of what has taken place in regard to biological collecting in Australia that there is a notable Banksian botanical collection, but no such Banksian zoological one. The time has come when it is imperative for us to make some organized attempt not only to take a census of our Australian fauna but to study it in its natural surroundings. Only those who have collected, more or less consistently, any special group of animals during the past twenty-five years realize to the full how rapidly our Australian fauna is being exterminated. Not many years ago it was possible to go just a few miles out of Melbourne to collect animals now unprocurable. The opening up of the country has had far-reaching effects upon the whole fauna. The introduction of dogs, cats, rabbits, and foxes, quite apart from the havoc caused by man in clearing the country, has meant the extermination of an appreciable part of the fauna. To take only one example: the destruction of the scrub and forest in the valley of the Bass River has resulted in the complete extermination of one of our most interesting marsupials, the little opossum-like *Gymnobelideus leadbeateri*. There are actually only four specimens of this extant, and it is extremely unlikely, owing to its very limited area of distribution, that any more will be found. To take another case in regard to lower but equally interesting forms: Some years ago a few of us interested in natural history spent a day or two turning over logs on the Dandenong hills. In one day we secured no less than thirteen species of land planarians, together with plentiful specimens of *Peripatus* and *Geonemertes*, the land nemertine. Searching the same spots recently, we found only a very few specimens of two species of planarians, no *Peripatus*, and no *Geonemertes*. Settlement and bush-fires are interfering disastrously with the land and fresh-water fauna, and yet it is perhaps the most interesting in any part of the world. Important as is the study of the marine fauna, we must, from a scientific point of view, realize very clearly the fact that

this will ever be with us, and we can investigate it at our leisure: but the land and fresh-water fauna is disappearing rapidly, and unless we now make an organized effort it will be too late to study it effectually, and future generations will wonder what manner of people we were not to leave behind us some adequate record of the marvellously interesting forms of animal life which we had succeeded in exterminating.

It is, however, right to mention that there is one group of animals—the birds—whose fascinating interest has resulted in attracting the attention of many naturalists from the time of Lewin and Gould down to the present, during which we have gained, thanks to the work of Mr. H. L. White, Captain S. A. White, Messrs. A. J. North, A. J. Campbell, and others, a fairly complete knowledge of the avifauna of Australia. To the generosity of Mr. H. L. White the Melbourne Museum is indebted for the gift of his great collection.

There are two or three records dealing with the land fauna that may be referred to as affording examples of the class of work required to be done, apart from simple collecting. Mr. Krefft published an account of the vertebrate animals that he had met with on the Murray River. He not only enumerates the different species, but gives us some account of their manner of life. In this journal, the *Victorian Naturalist*—the leading one of its kind in Australia—there are to be found admirable examples of the class of work needed. To mention only a few typical ones, we have Mr. Gerald Hill's paper on the life-history and habits of the case-moth, Mr. J. A. Kershaw's account of the burrow and "nesting" of *Platypus*, the late Mr. J. Booth's account of the habits of *Petaurus* in captivity, and the papers of Messrs. J. Shephard and J. Searle on the fresh-water fauna. Perhaps, however, the best example is the delightful work by the late Mr. Geoffrey Smith, entitled "*A Naturalist in Tasmania*."

Most unfortunately, a great part of faunistic work in Australia has been done by foreigners, owing to the enlightened generosity of patrons of science in Germany, Denmark, Norway, and Sweden. In early days Sir William Macleay was most generous in the endowment of natural history investigations: but, apart from him and Mr. W. A. Horn, who equipped his expedition to Central Australia, wealthy Australians have done but little to further the study of our fauna and flora.

The careful investigation of the fauna, whilst it requires a certain amount of endowment, is dependent still more upon the work of those who, in their own localities, are able and willing to devote their time to such work. To take one example only. It should be possible to organize in Tasmania a number of workers, each, or in groups, responsible for the study of one

or more particular forms of animal life, collecting them and noting (as far as possible) their habits, either personally identifying and describing them or forwarding them to some central authority. How essential it is that this work should be undertaken immediately may be realized from a report just issued, which states that last season, in Tasmania alone, 98,186 kangaroos, 93,103 wallabies, 16,244 black opossums, 40,041 grey opossums, and 274,534 ring-tailed opossums were destroyed. This ruthless extermination of the most interesting fauna in the world is simply appalling.

I would like to enter a strong protest against the sending to Europe of collections that can well be described out here. It has meant, for example—and most unfortunately so in the case of many Western Australian mammals—that the type specimens are in London instead of Perth. We are quite as competent to describe and take care of Australian type specimens in our National Museums as are our colleagues in Europe, and I trust the time may soon come when it will be recognized that this is so, and that their natural home is in the museums of Australia.

Meanwhile we need some organization to provide for the systematic working out of our fauna and flora, and with this object in view the Biological Section of the Science Association, at its recent meeting, recommended the formation of an Inter-State Committee composed of representatives of all the various societies concerned with the study of natural history and the preservation of our flora and fauna, whose duty it would be to organize, each in its own State or locality, the carrying out of special investigations. In addition to those who have had a strictly scientific training, there are scores of able and enthusiastic field naturalists who could ably undertake some special study, confined, perhaps, but none the less valuable because of this, to some locality with which he or she is especially acquainted.

National Museum, Melbourne, 20th January, 1921.

THE "AUSTRAL AVIAN RECORD."—In the double number of this journal (vol. iv., Nos. 4 and 5, issued 16th December) thirty-five pages are devoted to the completion of the "Name-list of Australian Birds" already noticed in the December *Naturalist*. The list offers many opportunities to bird-lovers to relearn both specific and vernacular names for their favourites, some of which will hardly be recognized in their latest christenings. An article is devoted to some early paintings of Australian birds by forgotten artists, and reference is made to General Davies, evidently one of the earliest students of Australian ornithology. A re-arrangement of the snipe and sandpipers will also afford points for discussion to the systematist.

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No. 447.

FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting of the Club was held at the Royal Society's Hall on Monday evening, 14th February, 1921.

Mr. F. Chapman, A.L.S., one of the vice-presidents, occupied the chair. Owing to traffic restrictions consequent on the strike, only about thirty members and visitors were present.

CORRESPONDENCE.

From Mrs. J. Atkinson, Longford, Tasmania, stating that her husband, Mr. E. D. Atkinson, C.E., an hon. member of the Club, had died on 25th October last.

The chairman stated that this was the first intimation he had heard of Mr. Atkinson's death. Mr. Atkinson had been an ardent worker among the fossils of the Table Cape beds (Tasmania), and he had been in communication with him on palæontological matters only a few months ago. He moved that a letter conveying the Club's sympathy be forwarded to Mrs. Atkinson. This was seconded by Mr. C. Daley, B.A., and carried.

Mr. F. G. A. Barnard said that another hon. member of the Club, Capt. Thomas Broun, had died in Auckland in August, 1919. He was an authority on New Zealand coleoptera, and the obituary notice in the last volume of the *Transactions of the New Zealand Institute* was the first notice of the death he had seen. On the motion of Messrs. Daley and Barnard, a resolution of sympathy was carried unanimously.

REPORTS.

A report of the visit to the Botanic Gardens on Saturday, 15th January, was given by Mr. F. G. A. Barnard, who said that a large party of members had spent an interesting afternoon under the guidance of the Director, Mr. J. Cronin, F.R.H.S., who had kindly conducted the party through portions of the Gardens and pointed out notable trees, &c. The ramble included a visit to the nursery and greenhouses, where many plants of special interest were seen.

A report of the Foundation Day (29th-31st January) excursion, the locality of which had been altered from Erica to Walhalla, made under the leadership of Mr. A. D. Hardy, F.L.S., owing to the indisposition of the leader, Mr. J. Firth, was given by Mr. C. Daley, B.A., who said that, though the distance from town (106 miles) was great for so short a time, the outing was greatly enjoyed by the party of eight. The

most noticeable feature was the fine display made by the Sunshine Wattle, *Acacia discolor*, on the hills around Walhalla.

A report of the visit to the Zoological Gardens on Saturday, 12th February, was given by Mr. F. Pitcher, who said that the Director, Mr. D. Le Souëf, C.M.Z.S., had met the members, but, after inspecting portion of the Gardens, owing to the great heat, had invited the members to adjourn to his office, where a pleasant hour or so was spent in viewing and remarking on his varied collection of natural history specimens, &c. Mr. Le Souëf had kindly provided afternoon tea, and he desired to move a vote of thanks to him for his hospitality. This was seconded by Mr. A. Keep, and carried unanimously.

ELECTION OF MEMBERS.

On a ballot being taken, Mr. Wm. Howat, 458 William-street, Melbourne, and Dr. G. McCallum, 454 St. Kilda-road, Melbourne, were duly elected as ordinary members of the Club.

GENERAL BUSINESS.

The chairman said that, in view of the heavy increase in the cost of publishing the *Naturalist*, the committee had proposed that an exhibition of natural history specimens and microscopical objects, open to the public by payment, be held early in June next, with the view of establishing a publishing fund, to which it was also hoped members able to do so would contribute.

Several members spoke in support of the suggestion, and it was resolved, on the motion of Messrs. H. B. Williamson and P. C. Morrison, that the proposal receive the full support of the members.

The acting hon. secretary said that a communication had been received from the Mount Buffalo Park Committee stating that grazing licences for the Buffalo plateau would not be renewed for 1921.

REMARKS ON EXHIBITS.

Remarks on their exhibits were given by Messrs. Chapman, Cudmore, Morrison, and Tadgell.

NATURAL HISTORY NOTES.

Dr. Sutton said that he had recently witnessed an attack by a wasp on the larva of a cut-worm moth, which, though many times larger and heavier than the wasp, had been carried off by the wasp to its underground nest near the base of an elm tree. Messrs. F. Spry and C. French added further details of the life-history of the wasp.

Mr. J. Searle gave an interesting account of a small black spider which had spun a web over the nest of an ant, *Pheidole*,

sp. An ant coming in contact with the web was at first caught, and held, but on the spider trying to secure the ant it was itself caught and carried off.

Mr. E. Cox referred to his recent experience while fishing in the Goulburn River, near Nagambie, when he had taken several Cat-fish, *Copidoglanis tandanus*, Mitch., in the river, whereas he had hitherto taken them only in the lagoons.

Mr. W. Ingram gave an account of his observations on the flight of a pair of Flying Phalangers at Marysville.

EXHIBITS.

By Mr. F. Chapman, A.L.S.—Flexible sandstone, from Delhi, India; de-vitrified bottle glass and window glass, from great fire at Chicago, 1871; perlitic structure in Canada Balsam.

By Mr. E. Cox.—Nodules of iron pyrites and gypsum from Torquay, Victoria.

By Mr. F. Cudmore.—Limestone, with shells and corals of Janjukian age, from Ooldea and Watson, on the East-West railway, South Australia; several unusually large specimens of *Ancilla*, sp., from the *Turritella* bed at Table Cape, Tasmania; Janjukian fossils from the lower bed at Table Cape—viz., *Thamnastræa sera*, Duncan, a large fossil coral characteristic of the Janjukian formation; palate teeth of the extinct shark, *Asteracanthus eocænicus*, Tate, sp.; teeth of extinct shark, *Carcharodon auriculatus*, Agg, sp.; rostral tooth of *Pristis Cudmorei*, Chapman, first record for Tasmania—all collected in January last; rostrum of a recent saw-fish, *Pristis*, sp., and of *Pristis Cudmorei*, Chap., from the Kalimnan of Beaumaris, Victoria, collected 1913—first record south of equator.

By Miss C. C. Currie.—Photograph of a bunch of the Spotted Orchid, *Dipodium punctatum*, gathered at Lardner; also photograph of nest of Striated Tit-Warbler, *Acanthiza lineata*, situated in a flower-garden near a house—a most unusual position.

By Mr. P. C. Morrison.—Photographs of Grass-trees, *Xanthorrhæa Tateana*, taken at Kangaroo Island, South Australia; specimens of grass-tree resin, commonly known as "yacca gum" or "gum acaroides," from Kangaroo Island; Lamp Shell, *Magellania flavesceus*, and seven species of Chiton, from Kangaroo Island.

By Mr. A. L. Scott.—Molybdenite, from Everton, Victoria; micro-slide and hand specimen of basalt, from Darebin Creek.

By Mr. F. P. Spry.—Specimen and nest of Potter Wasp, *Eumenes bicincta*, Sauss., from Broadmeadows.

By Mr. A. J. Tadgell.—Specimen of Stick-case Caterpillar, *Giketicus (Metura) elongatus*, which was found to have "walked" thirty-five feet from the rose-bush from which it cut the sticks

that form its case—assuming the “steps” of the caterpillar to measure an eighth of an inch, and comparing them with the paces of an ordinary walker, this distance would be fully equal to one and a half miles; three species of plants mentioned in Mr. Williamson's notes on Victorian plants (*Vict. Nat.*, May, 1919) as plants of which there is no record of their having been collected in Victoria, and of which there are no Victorian specimens in the National Herbarium—viz., *Oreomyrrhis pulvinifica*, F. v. M., Cushion Carraway, and *Azorella Muelleri*, Benth., Pennywort *Azorella*, both collected on Mount Hotham, and *Lycopodium Selago*, Linn., Fir Club-moss, collected near Mount St. Bernard, Australian Alps (specimens of all of these have been presented to the National Herbarium); *Gratiola Peruviana-pumila*, from Healesville; *Verbena officinalis*, L., Common Vervain, and the introduced Vervain, *V. bonariensis*, a native of South America, from Fern-tree Gully—Gembrook railway; two forms of plants changed by distortion of sap—viz., *Plantago lanceolata*, Rib Grass, and *Sonchus oleaceus*, Sow Thistle.

By Mr. L. Thorn.—Case of butterflies, containing twenty Victorian species, ten from New Guinea, and six from Ceylon.

After the usual conversazione the meeting terminated.

THE LATE HON. SIR FRANK MADDEN, K.B.—On the 17th February there passed away, in his 75th year, Sir Frank Madden, who was elected an ordinary member of the Club in December, 1902. Though his interests were always in sympathy with the objects of the Club, owing to official duties, and latterly to ill health, he had not taken an active part in its meetings. He was a close observer of nature, as indicated in a paper, “Notes on the Ibis” (*Vict. Nat.*, xix., p. 72, September, 1902), which he forwarded to the Club through Mr. G. A. Keartland before his election. In this he called attention to the invaluable benefit to farmers and graziers of the Ibis family as insect destroyers. He was an authority on the cultivation of grasses, and as chairman of the Studley Park Trust was zealous in his endeavour to preserve the natural beauty of the Park. Among his colleagues on the Trust are two other members of the Field Naturalists' Club—viz., Mr. J. Cronin, Director of the Botanic Gardens, and Mr. F. G. A. Barnard, as a representative of the Kew Town Council.

AUSTRALIAN FOREST LEAGUE.—At a recent meeting of the Council of the Australian Forest League it was decided that “the protection of the native flora and fauna generally” be added to the official aims and objects of the League.

A SKETCH OF THE GEOLOGICAL HISTORY OF AUSTRALIAN PLANTS: THE CAINOZOIC FLORA.

BY FREDERICK CHAPMAN, A.L.S., &c., Palæontologist to the National Museum, Melbourne.

(With three plates.)

(Read before the Field Naturalists' Club of Victoria, 13th Dec., 1920.)

(Continued from page 119.)

New South Wales Flora of Tertiary Age.—This has been chiefly described by Ettingshausen.* In most cases the determinations are based on a comparison with living Australian types of leaves, but others are referred to types of the European flora, and these have been generally questioned by Henry Deane.† An older Tertiary flora, probably Miocene in age, occurs in the leaf-beds in ferruginous sandstone and clay at Dalton, near Gunning, New South Wales. Ferns are represented by *Pteris Humei*, and there are also generic forms referable to *Fagus*, *Cinnamomum*, *Apocynophyllum*, *Pittosporum*, and *Eucalyptus*. Besides these, Ettingshausen described other genera of extra-Australian types, but, as Deane has already pointed out, there is a strong element of doubt concerning their true affinities, and some revisional work upon them appears to be required. It may here, however, be pointed out that the flora, as a whole, one of the richest Tertiary assemblages, bears a singular likeness to that of the "brush" type of vegetation seen at Berwick and Maddingley, in Victoria.

The Deep Leads of Vegetable Creek and Elsmore, New South Wales, contain a flora in part as old as the Berwick facies, such forms as *Eucalyptus Houtmanni*, *E. Mitchelli*, and *Fagus Muelleri* apparently being common to both.‡

At the Warrambungle Mountains there is a diatomaceous deposit interbedded with trachytic tuff containing leaves of *Cinnamomum Leichhardti*, Ett., determined by W. S. Dun, whilst Deane has described quite a number of leaves of the Older Tertiary type,§ referred to the genera *Cryptocarya*, *Endiandra*, *Anopteris*, *Lyonsiæphyllum*, *Coprosmaephyllum*, and *Grevillea*, together with a fern, *Pteris abbreviata*.

Queensland Plant-Beds of Early or Middle Tertiary Age.—

* "Contributions to the Tertiary Flora of Australia," Mem. Geol. Surv. N.S.W.: Palæont., No. 2, 1888 (translated from Denkschr. Math.-Naturw. k. Akad. Wiss. Wien, 1886, vol. liii.)

† Proc. Linn. Soc. N.S. Wales, 1900, pp. 463-475; *ibid.*, 1901, pp. 581-590.

‡ See Ettingshausen's Memoir above quoted, part 2.

§ Records Geol. Surv. N.S. Wales, vol. vii., part 3, 1903, p. 231; and vol. viii., part 3, 1907, p. 187.

These are situated between Darra and Oxley, near Brisbane. They consist of fine whitish to yellow argillaceous sands, passing down into sandstone and grits; they rest on an eroded surface of the Ipswich beds.* Skertchley regarded them as "very old Eocene (Laramie beds)." From their general facies, however, one concludes that they are the equivalent of the typical leaf-beds of the older series of Tertiaries in other States. Shirley has described from these beds leaves which he refers to *Sapindus oxleyensis*, *Ficus subsycamor*, and *Myrica subsalicina*.† The most extensive piece of work upon this plant-bed has, however, been published by Ettingshausen in a work entitled "Beitrage zur Kenntniss der Kreideflora Australiens,"‡ in which he describes 64 species of fossil plants. Such genera as *Banksia*, *Cinnamomum*, *Diemenia*, and *Eucalyptus* can be reasonably accepted, but others, as *Quercus*, may be open to question. Ettingshausen places the horizon in the Cretaceous series, but the presence of well-advanced types of eucalypts and many of the genera and species found in Mid-Tertiary beds elsewhere in Australia, exclude it from so old a formation as the Cretaceous. In this memoir Ettingshausen refers to Darra as Warragh, a misnomer which also enters into his specific references. The species of *Apocynophyllum* here recorded recall those of the Victorian Tertiary flora.

Travertine Lake Deposits near Hobart, Tasmania.—The compact travertine limestone of Risdon, Geilston, Sandy Bay, and other localities near the mouth of the River Derwent contains beautifully-preserved impressions of fossil leaves and fruits.§ From these beds we may cite *Araucarites*, sp., *Notofagus Risdoniana*, *Cinnamomum Woodwardi*, *Lomatia praelongifolia*, *Coprosma praeuspifolia*, and *Apocynophyllum*, sp. The bulk of the flora has been dealt with by Ettingshausen,|| but, as with the New South Wales fossils, the list apparently requires some revision.

Tertiary Plants of South Australia.—The dicotyledonous floras of the Lakes Eyre and Torrens districts also bear close resemblance to the Maddingley, Berwick, and Vegetable Creek plant-remains, and they are, without doubt, fairly well developed as a Tertiary flora.¶ The list of plant-remains, with localities given by Tate and Watt, are as under:—

* See Skertchley, *Queensland Naturalist*, vol. i., No. 2, June, 1908, p. 51; also *id.*, *ibid.*, vol. i., No. 1, March, 1908, p. 28 *et seq.* (map).

† Geol. Surv. Queensland, Bull. No. 7: Additions to the Fossil Flora of Queensland.

‡ Denkschr. Math.-Naturwiss. k. Ak. Wien, vol. lxii., 1894.

§ Johnston, Proc. Roy. Soc. Tas. for 1873, pp. 34-48; *id.*, *ibid.*, for 1879, pp. 81-90.

|| "Contr. Tert. Flora Australia," 1888.

¶ See Ettingshausen's memoir above quoted, part 2.

<i>Magnolia Brownii</i> , Ett.	..	..	Lake Frome.
<i>Cinnamomum</i> , sp.	..	..	William Creek.
<i>Apocynophyllum Mackinlayi</i> , Ett.	..	..	Arcoona.
<i>Bombax Sturtii</i> , Ett.	..	..	Elizabeth River.
<i>Eucalyptus Diemenii</i> , Ett.	..	..	Arcoona.
„ <i>Mitchelli</i> , Ett.	..	..	Elizabeth River.
<i>Banksia prægrandis</i> , n. sp.	..	..	Bottle Hill.
<i>Quercus Greyi</i> , Ett.	..	..	Elizabeth River, Arcoona, and Wyeculuna.
„ <i>Wilkinsoni</i> , Ett.	..	..	Wyeculuna.
<i>Alnus Muelleri</i> , Ett.	..	..	Wyeculuna.

Flora of the Deep Leads.—The old alluvial beds of the Victorian, Tasmanian, and New South Wales river-systems probably date from the Miocene; they are notably those of Vegetable Creek, New South Wales, and Hoddle's Creek and Pitfield Plains, in Victoria. From the latter locality a fairly old flora has been previously referred to (see *antea*, p. 48). The alluvials of the Dargo High Plains may be regarded as part of the Miocene Deep Lead system. The above deposits are probably contemporaneous with the "Older Gold Drift" of Victoria.* Others, however, as Haddon, Nintingbool, Tanjil River, Smythe's Creek, Eldorado, Beaufort, and Creswick, are of later age, probably Lower Pliocene. Many of these leads lie at a depth of 100 to 150 feet below the present ground-level. From the presence of gravels and great quantities of wash-dirt, it is safe to conclude that the area was once elevated to many hundreds of feet above sea-level, and also that the climate was then much moister than at present. In all probability the age of the generality of the Deep Leads was Lower Pliocene, although, as previously noticed, the river systems commenced to grave their courses on the peneplain much earlier (Miocene), and continued to exist into early Pleistocene times. The chief fossil remains in the Deep Leads are fruits of shrubs and trees resembling those now living, as *Capparis* and *Pittosporum*, with coniferous fruits as *Callitris* and occasional wood-fragments or trunks of trees having affinities to the latter genus. Leaves of *Eucalyptus pluti*, M'Coy, also occurred at Daylesford in the Deep Leads, a species allied to the living *E. globulus* (Blue Gum). The following fruits were determined from the Deep Leads by Baron von Mueller,† who considered the flora to indicate a more equable, warmer, and moister climate. They are:—

* For a discussion on the age of these "drifts" see the valuable paper lately published by R. H. Walcott—"Evidence of the Age of Some Australian Gold Drifts," &c.—*Rec. Geol. Survey N.S.W.*, vol. ix., pt. 2, 1920, pp. 66-97.

† *Geol. Surv. Vict.*, "Observations on New Vegetable Fossils of the Auriferous Drifts, 1874"; also second decade, 1883.

Celyphina Maccoyi.
Conchotheca rotundata.
 " *turgida.*
Dicune pluriovulata.
Odontocaryon Macgregorii.
Pentacune Clarkei.
 " *brachyclinis.*
 " *trachyclinis.*
Phymatocaryon angulare.
 " *Mackayi.*
Platycoila Sullivani.
Pleioclinis Couchmani.
 " *Shepherdi.*
Plesiocapparis prisca.
Rhytidolthea Lynchei.
Spondylostrobis Smythi.
Thaumatocaryon Maclellani.
Xylocaryon Locki.

At Spring Hill Central Leads, Victoria,* a bone of a crocodile, probably *Pallimnarchus pollens*, identified by C. W. De Vis, was discovered at a depth of 295 feet. This deposit also yielded to Mr. Bale the following diatoms:—*Campylodiscus bicostatus*, *Surirella kerguelensis*, *Epithemia zebra*, *E. gibba*, *Synedra ulna*, vars., *Diatomella Balfouriana*, *Hantschia amphioxys*, *Cocconeis placentula*, *Gomphonema gracile*, *Pinnularia distinguenda*, *P. divergens*, *Navicula lauta*, *N. cuspidata* (craticular form), *N. radiosa*, var. *tenella*, *Diploneis elliptica*, *D. major*, and (?) *Chatoceros*. The genus *Campylodiscus* suggests estuarine influence. This diatomaceous deposit links up with the Pleistocene Diatomite found at Talbot, in Victoria, and at Cooma, Barraba, and the Richmond River in New South Wales.

Prof. Ewart has determined a fragment of fossil wood, found in a mine at Deep Creek, near Daylesford, at a depth of 300 feet, as agreeing very closely with *Acacia melanoxylon* (Blackwood).†

Redruth Ironstone.—An ironstone, probably of the same age as the Deep Leads, was found at Redruth, near Casterton; it contained an impression of a bird's feather,‡ along with which are good imprints of *Eucalyptus* leaves of the *E. amygdalina* (Narrow-leaved Peppermint) type, and also *Banksia* leaves, indistinguishable from the living *B. marginata*, Cavanilles.

Fossil Wood in the Bairnsdale Gravels.—A great deal of the old fossil flora of the Miocene and Pliocene forests of Victoria,

* See Hunter, S., "The Deep Leads of Victoria," Mem. Geol. Surv. Vict., No. 7, 1909, pp. 6, 7.

† Vict. Nat., vol. xxxiii., 1916, p. 76.

‡ Chapman, Proc. Roy. Soc. Vict. (n.s.), vol. xxiii., part 1, 1910, pp. 21-26, pls. iv. and v.

notably in East Gippsland, has been preserved in the form of silicified tree-trunks. These occur in a more or less water-worn condition, mingled with the gravels of the Bairnsdale to Orbost area. Two of these ancient forms of trees have been identified by the writer * as *Eucalyptus* cf. *meliiodora*, Cunningham (Yellow Box), from Bruthen, and *E.* aff. *piperita*, Smith (Peppermint Gum), from Mallacoota Inlet. Their microscopic structure is wonderfully preserved, although occasionally broken down by chalcedonic crystallization, probably where the tissue was already partially decayed when petrification took place.

Newer Volcanic Tuffs with Leaves and Fruits.—At Warrnambool volcanic tuff occurs, containing impressions of *Eucalyptus* leaves. There is a fine block of this exhibited in the galleries of the National Museum. In the scoriaceous tuff of Mount Gambier, South Australia, some exceptionally well preserved fern-fronds of *Pteridium aquilinum* (Bracken) and leaves of *Banksia marginata* (Silver Banksia) were found, the occurrence of *P. aquilinum* in these prehistoric beds proving its claim as an indigenous and not an imported plant. An indubitable impression of the end of a *Casuarina* cone (near *C. stricta*) in lava from Yandoit Hill has recently been described in the pages of this journal.† This is another remarkable instance showing how slowly the heat from the lava escapes when in contact with ligneous material like plant-stems and woody fruits.

Diatomaceous Deposits of Pleistocene Age.—These occur, as a rule, filling up depressions in the basalt flows of late Tertiary age, or else interbedded between intermittent flows; in other cases they are found, generally in an impure state, in backwaters of creeks covered by river silt. The best-known localities are, in Victoria, at Talbot, Craigieburn, Sebastopol, Portland, Lancefield, and South Yarra; in New South Wales, at Cooma, Barraba, and the Richmond River; in Queensland, at Pine Creek. The genera, except in the case of South Yarra, are of the well-known fresh-water types, *Melosira*, *Navicula*, *Cymbella*, *Synedra*, *Tabellaria*, *Stauroneis*, and *Gomphonema* being best represented, and there are usually present spicules of the fresh-water sponge, *Spongilla*. The localities have been excellently summarized for Victoria by Mr. D. J. Mahony.‡

The writer has lately found the remains of a fresh-water alga, apparently referable to *Cladophora*, in the Richmond River deposit, and Von Mueller has already described seeds,

* *Id.*, *ibid.*, vol. xxxi., part 1, 1918, pp. 172-175.

† *Vict. Naturalist*, vol. xxxi., 1914, p. 89.

‡ *Bull. Geol. Surv. Vict.*, No. 26, 1912.

which he named *Liversidgea oxyspora*, and remains of *Pteris* from the same beds.*

Thus closes my very cursory glance over one of the most fruitful and useful fields of research for Australian workers.† It will be seen that our palæobotany has not been entirely neglected, but as yet the ground has only been ploughed in certain promising areas, a preparation of fallowing which will surely produce good palæobotanical crops to be harvested by the coming generations of students of ancient plant-life.

EXPLANATION TO THE PLATES IN ILLUSTRATION OF THIS AND THE TWO FOREGOING PAPERS OF THE SERIES.

PLATE 6.—PALÆOZOIC PLANTS.

- Fig. 1.—*Girvanella conferta*, Chapman. Silurian (Yeringian). Tyers River, Gippsland. $\times 35$.
 Fig. 2.—*Bythotrephes divaricata*, Kidston. Silurian. Walhalla, Gippsland. Half nat. size.
 Fig. 3.—*Haliserites Dechenianus*, Göppert. Silurian. Thomson River, Gippsland. Nat. size.
 Fig. 4.—*Sphaerocodium gippslandicum*, Chapm. Middle Devonian. Mitta Mitta River, Gippsland. $\times 7$.
 Fig. 5.—*Lepidodendron australe*, McCoy (Leaf-cushions). Carboniferous. Queensland. $\times 3/2$.
 Fig. 6.—*Archæopteris Wilkinsoni*, Feistmantel. Carboniferous. Stroud, New South Wales. Nat. size.
 Fig. 7.—*Cordaites australis*, McCoy. Upper Devonian. Iguana Creek, Victoria. Half nat. size.
 Fig. 8.—*Rhacopteris intermedia*, Feistmantel. Carboniferous. Port Stephen, New South Wales. Nat. size.
 Fig. 9.—*Gangamopteris cyclopteroides*, Feistm. Carbo-Permian. Bacchus Marsh, Vict. Half nat. size.
 Fig. 10.—*Glossopteris Browniana*, Brongn. Carbo-Permian. New South Wales. Half nat. size.
 Fig. 11.—*Phyllothea Etheridgei*, Arber. Carbo-Permian. New South Wales. Two-thirds nat. size.
 Fig. 12.—*Reinschia australis*, Bertrand. Carbo-Permian. New South Wales. $\times 592$.

PLATE 7.—MESOZOIC PLANTS.

- Fig. 1.—*Phyllothea Hookeri*, McCoy. Rhaetic. New South Wales. Nat. size.
 Fig. 2.—*Thinnfeldia odontopteroides*, Morris, sp. Trias. New South Wales. Nat. size.
 Fig. 3.—*Tæniopteris Daintreei*, McCoy. Jurassic. Gippsland. Nat. size.
 Fig. 4.—*Sphenopteris ampla*, McCoy. Jurassic. Gippsland. Nat. size.
 Fig. 5.—*Cladophlebis australis*, Morris, sp. Jurassic. Gippsland. Nat. size.
 Fig. 6.—*Stenopteris elongata*, Carruthers, sp. Ipswich series, Queensland. Nat. size.

* Journ. and Proc. Roy. Soc. N.S. Wales, vol. x. (1876), 1877, p. 230.

† For Parts I. and II. (Palæozoic and Mesozoic), see this journal, vol. xxxiv., January, 1918, p. 140, and vol. xxxv., February, 1919, p. 148.

PLATE 6.



PLATE 7.



F. CHAPMAN, *del.*

AUSTRALIAN MESOZOIC PLANTS.

PLATE 8.



AUSTRALIAN CAINOZOIC PLANTS.

F. CHAPMAN, del.

- Fig. 7.—*Phœnicopsis elongatus*, Morris, sp. Jurassic. Tasmania. Nat. size.
 Fig. 8.—*Ginkgo digitata*, Brongn., sp. Ipswich series, Queensland. Circ. two-thirds nat. size.
 Fig. 9.—*Stachyopitys*, sp. (? male flower of Ginkgoales). Trias. Queensland. Nat. size.
 Fig. 10.—*Ptilophyllum pecten*, Phillips, sp. Trias. Queensland. Nat. size.
 Fig. 11.—*Taxites planus*, Feistm. Jurassic (Walloon ser.) Queensland. Nat. size.
 Fig. 12.—*Brachyphyllum gippslandicum*, McCoy. Jurassic. Gippsland. $\times 3$.
 Fig. 13.—? *Celastrophyllum*, sp. Neocomian. Styx Bore, Queensland. Nat. size.

PLATE 8.—CAINOZOIC PLANTS.

- Fig. 1.—*Liversidgea oxyspora*, Mueller (seed). Pleistocene or Late Tertiary. Richmond River, N.S. Wales. $\times 5$.
 Fig. 2.—*Pteris abbreviata*, Deane. Tertiary. Elsmore, New England, N.S. Wales. Nat. size.
 Fig. 3.—*Fagus* (*Notofagus*) *Maideni*, Deane. Tertiary. Berwick. Nat. size.
 Fig. 4.—*Nephelites Ulrichi*, Deane. Tertiary. Pitfield Plains, Vict. Nat. size.
 Fig. 5.—*Casuarina*, sp. Tertiary. Sentinel Rock, Cape Otway, Vict. Nat. size.
 Fig. 6.—*Cinnamomum polymorphoides*, McCoy. W. of Maddingley, Vict. Nat. size.
 Fig. 7.—*Tristanites angustifolia*, Deane. Tertiary. Berwick. Nat. size.
 Fig. 8.—*Eucalyptus Mitchelli*, Ettingsh. Tertiary. Berwick. Nat. size.
 Fig. 9.—*Eucalyptus Kitsoni*, Deane. Tertiary. Berwick. Nat. size.
 Fig. 10.—*Coprosmaephyllum angustifolium*, Deane. Tertiary. Sentinel Rock, C. Otway, Vict. Nat. size.
 Fig. 11.—*Banksia myricæfolia*, Ettingshausen. Tertiary. Vegetable Creek, N.S. Wales. Nat. size.
 Fig. 12.—*Spondylostrobilus Smythi*, Mueller. Tertiary Deep Leads. Haddon, Vict. Nat. size.

THE LATE CAPT. THOMAS BROWN.—The *Transactions of the New Zealand Institute* for 1920 record the death, at Auckland, N.Z., in August, 1919, at the age of 81, of Capt. T. Brown, who was elected an hon. member of the Club in July, 1883. He was of Scottish origin, and, after being engaged in the Indian Mutiny, arrived in New Zealand in 1863, and saw some service in the Maori War. Devoting his attention to entomology as a hobby, he became the recognized authority on New Zealand beetles, and his "Manual of the Coleoptera of New Zealand," issued in 1880, and continued by supplementary parts, is a standard work. For several years he filled the position of Government Entomologist of New Zealand. He was a genial companion, with a fund of anecdote, and a worker up to the last.

THE LATE MR. E. D. ATKINSON.—By the death of Mr. E. D. Atkinson, who passed away at Hobart on 25th October, 1920, Tasmania has lost a notable geologist and one of its most industrious collectors of fossils, while the Field Naturalists' Club has lost an honorary member of long standing. He was a Yorkshireman by birth, and was connected with the Tasmanian Railways both at Waratah and Sulphur Creek. Together with his son, R. N. Atkinson (who was accidentally killed whilst cleaning a military rifle about seven years ago), Mr. Atkinson spent his leisure time in searching the rich fossil beds of Table Cape. The results are to be found in the many choice and new specimens described and included in the collections of the National Museum, Melbourne, and in the museums of other States. He and his son had keen eyes for not only the larger fossils, as Cetaceans and Volutes, but also for the minutest; for as long ago as 1912 the writer commenced to investigate the relationships of a microscopic fossil received from them, of which the publication has unfortunately been delayed till now, and which has been named *Sherbornina Atkinsoni*, gen. et sp. nov. In an appreciation of Mr. E. D. Atkinson in the *Launceston Examiner* we read:—"So, working, plodding, and collecting, and fighting all the common affairs of life, successfully filling an official position, and yet finding time to learn more of the history of Tasmania in Miocene time than perhaps any man in Australia, friend Atkinson completed his allotted span of life, and is now left to us as a memory of a good neighbour, a just and hard-working officer in various offices, a staunch friend, and withal the holder of the proudest title that man can covet—a gentleman."—F. C.

"A MANUAL OF THE BIRDS OF AUSTRALIA."—Messrs. H. F. and G. Witherby will publish immediately the first volume of the above work, edited by Gregory M. Mathews (author of "The Birds of Australia") and Tom Iredale. It will be very fully illustrated with coloured and monochrome plates.

THE MORIALTA FALLS RESERVE, S.A.—The last annual report of the Director of National Pleasure Resorts of South Australia contains an account of the work done at the Morialta Falls Reserve, situated in the Mount Lofty Ranges, about seven miles north-east of Adelaide. The reserve contains a very fine gorge with cliffs rivalling those of the famous Werribee Gorge. Two miles of pathways have been cut, with rustic bridges here and there. Large numbers of native trees and shrubs have been planted to reclothe the slopes denuded before the reserve was acquired by the Government, and garden beds, gay with flowering plants, have been introduced in certain positions. Being so near Adelaide, it is largely visited on Sundays and holidays.

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FIELD NATURALISTS' CLUB OF VICTORIA.

THE ordinary monthly meeting was held at the Royal Society's Hall on Monday evening, 14th March, 1921.

The president, Mr. J. Gabriel, occupied the chair, and about fifty members and friends were present.

CORRESPONDENCE.

From Mr. R. W. Armitage, M.Sc., resigning his position as hon. secretary owing to pressure of other work.

Resolved, on the motion of Mr. G. Coghill, that the resignation be accepted with regret.

Mr. F. G. A. Barnard consented to act as hon. secretary until the annual meeting in June.

REMARKS ON EXHIBITS.

Mr. F. Chapman, A.L.S., referred to his exhibit of wind-polished polyzoal limestone, from Torquay, and explained how the condition was produced.

Mr. F. G. A. Barnard called attention to his exhibit of a plant of the fern *Botrychium ternatum*, Swtz., Moonwort. The fern is a deciduous one, and usually sends up its new frond or fronds (two) in the second week in February. Some seasons only a sterile frond is sent up; in others both fertile and sterile fronds are produced. This year a frond appeared at the usual time, but was unfortunately eaten off—most probably by wood-lice, which have been very active this season, and are very fond of young fern-fronds. The plant has now produced a second growth, which appears as if it would develop into a pair of fronds. This plant was collected on a Club excursion in the Oakleigh district some thirty years ago, and has been exhibited in various stages on several previous occasions.

Mr. H. B. Williamson referred to his exhibit of two new species of *Pultenæa*, which he had determined in working through the specimens of the genus at the National Herbarium.

PAPER READ.

By Mr. J. W. Audas, F.L.S., entitled "Through the Balangum Ranges and at Rose's Gap (Grampians)."

The author gave an interesting account of a visit paid to these localities in October last, when he was successful in securing new records for many plants, including several orchids. The paper was illustrated by a large series of dried specimens.

Mr. E. E. Pescott, F.L.S., in remarking on the plants noted by the author, regretted that Mr. Audas had introduced

vernacular names not adopted by the Plant Names Subcommittee: the latter, he considered, should be used in every case.

EXHIBITS.

By Mr. J. W. Audas, F.L.S.—Fifty-three species of dried plants from the Grampians in illustration of paper, including twenty-two species of orchids, four being new for Victoria—viz., *Prasophyllum gracile*, Rogers, *Calochilus paludosus*, R. Br., *Caladenia reticulata*, Fitzg., and *Thelymitra megcalyptra*, Fitzg., and three new for south-west Victoria—viz., *Prasophyllum odoratum*, Rogers, *P. album*, Rogers, and *Microtis parviflora*, R. Br.; also *Pultenaea costata*, Williamson, and *Trymalium ramosissimum*, Audas, both new to science.

By Mr. F. Chapman, A.L.S.—Wind-polished polyzoal limestone, from Torquay.

By Mr. F. Cudmore.—Two fossil fish from Upper Cretaceous of Mount Lebanon, Syria: specimens of an uncommon Cainozoic regular echinoid, *Calopleurus paucituberculatus*, Gregory, from Janjukian of Morgan, S.A.

By Miss Cruickshank.—Spider orchid from Western Australia, with sepals 6 inches in length.

By Mr. C. French, jun.—Introduced plants, *Opercularia ovalis*, Broad Stinkweed, and *Linum gallicum*, Yellow Flax, collected at Lower Ferntree Gully.

By Mr. T. Green.—Stereoscopic photographs of various flowers.

By Mr. E. E. Pescott, F.L.S.—Living and herbarium specimens of a rare Amaryllid, *Calostemma purpureum*, R. Br., "Garland Lily," from Hattah, N.W. Victoria (collector, J. E. Dixon), the living flowers from cultivated plants. Examples of plant teratology—(a) *Stylidium graminifolium*, Swartz, with a terminal cluster of flowering spikes; (b) *Syringa vulgaris*, L., foliage showing two and three leaflets; (c) *Brunonia australis*, Smith, with twin flower-heads and very large floral bracts; (d) *Trifolium repens*, L., with four, five, and six leaflets instead of normally three; (e) orchid, *Acianthus caudatus*, R. Br., with two leaves, one centrally placed on stem.

By Mr. A. J. Tadgell.—Specimens of Tufted Knawel, *Scleranthus diander*, Twin-flowered Knawel, *S. biflorus*, and Mossy Knawel, *S. mniaroides* (rare), all collected at Mount Feathertop, at 5,800 feet, by exhibitor.

By Mr. H. B. Williamson.—Specimens of the new *Pultenaeas*—*P. costata*, from Grampians, coll. C. Walter and C. French, jun., and *P. recurvifolia*, from Portland, coll. Mr. Allitt—described by him in *Proceedings Royal Society of Victoria*, March, 1921.

After the usual conversazione the meeting terminated.

THREE ANGLERS AT THE MURRAY.

BY J. C. GOUDIE.

(*Read before the Field Naturalists' Club of Victoria, 13th Sept., 1920.*)

Five hundred leagues the limpid waters flow
Of mighty Murray, fed by Alpine snow.

ABOUT the middle of December of last year our party of three left home on a 60-mile drive to the Murray, our intention being to camp for a few days amongst the fine Red Gums which adorn the banks of our noblest river. The buggy was well loaded with camping outfit, including, of course, plenty of fishing tackle, as we intended to live by the rod during our stay. Passing Green Lake and Sea Lake (from which, especially the first-named, we have taken many a full creel of English Perch), our road lay north-easterly, crossing the southern arm of Lake Tyrrell, which was then a glittering white salt-pan, devoid of water, stretching away to the north as far as one could see. The day was very hot, and a quivering mirage hung over the "lake," distorting the stunted clumps of Mallee and Paperbark trees, so that they assumed weird, fantastic, and apparently moving shapes; and it required little effort to imagine the shades of departed blackfellows holding corroboree on the shores of this desert lake. Some years ago, during the wet seasons, Lake Tyrrell was a magnificent sheet of water, some fifty miles in circumference. Wild-flowers bloomed in profusion along the sandy banks, whilst on the flats acres of Mesembryanthemum ("Pig-face") displayed a delightful colour-scheme of green and pink. Across Tyrrell Downs and the adjoining country, once marked on the map as "dense scrubs of *Eucalyptus dumosa*," but now a vast undulating plain, relieved by clumps of Murray Pine, settlers' homes, and strips of mallee along the roads, forming interminable avenues, which run north and south, east and west. This is typical "settled" Mallee country, extending almost to the banks of the Murray.

Camping for the night at a shire dam, which was almost overgrown with tall Cumbungie reeds, we heard with surprise and delight the brisk, cheerful notes of the Reed Warbler. Resuming our way next morning, we kept a sharp look-out for further novelties, a link with the past appearing in a Mallee Fowl, which ran swiftly across the track into a patch of scrub. Other birds noted were Black-backed Magpies, foraging bands of Babblers and Thornbills, the White-face, Black-and-White Fantail, Galah, Red-backed, Mallee, and Crimson-bellied Parrakeets. No matter how dry the season, these birds seem able to sustain themselves, and stick to their old haunts. In a clump of Myalls a pair of Pied Honey-eaters was seen, these birds being quite new to us. Passing a big "goanna" basking

on the road, we shortly struck the Piangil railway line, and, following this, were soon driving through the orange groves and vineyards of Nyah.

Descending into the river valley, the track led through the Red Gums until, coming to a sheltered glade, we pitched the tent on the bank of the broad and placid Murray. The river was low for the time of year, but the water was clear and soft, and made excellent tea. Lunch disposed of, the fishing tackle was brought out—strong greenheart rods of 10 feet, reels holding 50 yards of linen schnapper line, and a varied assortment of hooks and sinkers. Baiting with worm (which we had brought with us, as none are obtainable near the river), we cast well out, the bait swinging along the bottom with the current. There was no long waiting for bites, but vicious tugs, a quick movement of the butt, a few minutes' play with a taut line, and the fish would be gently drawn out on the sloping bank. In a couple of hours we had Cod and Perch sufficient for several meals. It is surprising how one's appetite improves on these camping-out trips. The high cost of living, the state of the crops, the latest strike are all forgotten, and a 5-lb. Murray Cod, fresh from the river, makes a dish fit for kings. A sound sleep on a couch of gum-leaves, and we were up at the first call of the Kookaburra for an early morning dip. We decided this day to try for Bream—a very handsome fish of fine quality. The Bream frequent comparatively shallow water near the sand-spits, while the Cod are mostly caught in the deep holes amongst the snags. Fresh-water shrimps are a good bait for all Murray fish, and are easily procured. A kerosene tin is obtained, holes punched in the sides and bottom, and a skinned rabbit or mutton-bone placed therein and secured. A piece of rope is tied to the handle, and the tin is sunk in the water near some log, &c., left there half an hour, then quickly drawn up, and you have shrimps in plenty.

On our way to the next bend in the river, where there was a good stretch of sandy beach, a likely spot for Bream, several Tiger Snakes were disturbed; but, unless they actually disputed the right-of-way (which they seldom did), we found it the best policy to leave them alone. There were so many of these reptiles that it seemed merely a waste of time to stop and kill them, for all the difference it would make in their number. After the first day or two one gets used to them. Getting to work with the Bream tackle (which is much finer, with smaller hooks, than that used for Cod), we soon had vigorous bites, and the sport was fine indeed. Like the gallant Black Bream of the southern estuaries, the Murray Bream is a famous fighter, sometimes leaping clear of the water, and

careful handling is necessary to land them. While one of the party was playing a fine three-pounder, a Tiger Snake scuttled down the bank, passed between his feet, and slid into the river; but the angler kept his line tight, and the fish was safely landed. Returning to camp with bulging fishing-bags, we noticed a flock of about fifty Pelicans feeding on the Barney Miller Creek. Taking alarm, they rose in a body, making a great splashing as their broad wings struck the water. Half a dozen stately White Egrets wading in the shallows formed a delightful picture, and amongst the branches of a lofty Red Gum were seen several of the beautiful Yellow Parrakeet, or Swamp Lory. Noisy Miners and Magpie-Larks were plentiful, the brilliant plumage of the Bee-eater and Sacred Kingfisher enlivened the scene, the Friar-bird amused us with his curious vocal efforts, and the notes of the Bronze-winged Pigeon and Peaceful Dove were constantly heard. On the New South Wales side of the river a chain of small lakes extends inland; these are filled from the river during flood-time. These lakes—Poomah, Poon-boon, Genoe, &c.—are proclaimed sanctuaries for native birds, and on a previous visit by the writer, in the month of April, the bird-life on and about them was worth going a long way to see. Black Swans, Pelicans, Maned Geese, ducks of many species, Cormorants, Grebes, and Coots almost covered the surface of one small lake, which supported a prolific growth of “weed” and water-lily, while round the shores or on the flats Herons, Spoonbills, Ibises, Egrets, Stilts, Avocets, Plovers, Snipe, and Dottrel abounded. A number of Whistling Eagles circled about, and a thousand feet overhead soared the monarch of all—the Wedge-tailed Eagle. Of interest to the naturalist, but heartily and frequently anathematized by anglers, are the small tortoise of the Murray. About noon on a hot day, as you walk along the bank, you hear a succession of splashes, as, alarmed at your approach, the tortoise dive into the river from the logs where they have been basking in the sun. They take the bait from your hook with fiendish persistence, but you cannot catch them. The big spiny Murray lobsters are also very troublesome at times in this way, especially if you are using fish or bird for bait, and the only thing to do is to wind up and try to dodge them.

When enough fish for the needs of the day had been caught the rods would be laid aside, and the entomologist spent some time turning logs and bark-stripping in a search for beetles. Amongst those noted were *Psolidura flavosetosa*, *Sclerorhinus vestitus*, *S. sublineatus*, *Carenum anthracinum*, *C. imitator*, *C. elegans*, *Clivina quadratifrons*, *Pheropsophus verticalis*, *Catadromus lacordairi*, and many others. Under a log was found a specimen of the fine Tenebrionid, *Prophanes metallescens*,

in the act of changing from the pupa to the adult state. The days passed happily and all too quickly. Angling, of course, was the main diversion, and no difficulty was experienced in obtaining an ample supply of fish. Cod, Silver Perch, Yellow Perch, and Bream were the fish caught. The introduced Brown Trout is said to be captured here occasionally, but none came to our hooks. At a farm-house we were shown the head of a Cod which weighed 58 lbs. It was caught on a night-line, the bait on which had been swallowed by a small fish, which had, in turn, been gorged by the big fellow. These veterans of the river are only to be caught at night, and, having this in mind, the enthusiast of the party (not the writer) decided to try night-fishing, and bagged a nice 10-lb. Cod. The next night he ventured again, and this time hooked a fish that tried his tackle well. The tough green-heart bent and swayed and the 5-inch reel hummed as the big Cod strove frantically to reach the snags; but time and skill prevailed, and he was lifted out by the gills—15 lbs. to the ounce. At once extracting the hook, a piece of stout line two yards in length was passed round the gills and tied, the other end fastened to a stake driven in the bank, and the fish returned to the river, little the worse for the encounter. Fish thus tethered may be kept a couple of days and taken home fresh (as this one was) to convince the sceptics that the biggest fish does not always escape.

THE SATIN BOWER-BIRD.—In the *Sydney Mail* of 30th March, Mr. Jas. Potter, R.A.O.U., gives an account of the finding of a bower of a Satin Bower-bird, *Ptilonorhynchus violaceus*, Vieill., in the National Park, at Port Hacking, near Sydney. He and a fellow-naturalist had spent many week-ends in the haunts of these birds on the look-out for a bower, and at last detected one not far from the main drive through the Park. The bower, or "playhouse," consisted of a great number of twigs stuck in the ground in such a manner as to form an arch. This was built on the ground in the middle of a platform of pine needles trampled flat, measuring about three feet in diameter, the bower itself being about twelve inches long, just large enough to accommodate the female bird. The structure is used only for courting purposes, the male bird taking great pleasure in decorating it daily with coloured articles of various descriptions. In the case under notice blue flowers were brought regularly for the purpose. Some blue beads thrown on the ground some twenty feet from the bower were quickly detected and added to the decorations. Mr. Potter visited the bower nearly every week-end for some time, and made notes of his

observations. The record of one day's proceedings may be taken as an example. With his friend he arrived at the bower before sunrise. Their intentions were to photograph the bird at the bower—a rather difficult operation, owing to the situation of the bower and the light conditions; make a complete record of what was actually done, and find out how early the performance commenced. Owing to the nature of the vegetation neither the bower nor the bird could be seen until the observers were right on them. They had not waited long when the male bird arrived with a spray of blue flowers. It was now 4.45 a.m., and only just sufficiently light to see the bower properly. After dropping the flowers at the side of the bower the bird began re-arranging the different objects, now and then pondering over the work, just like an old man. For ten minutes it kept this up, apparently making ready for the day's courting, then ran away some distance before flying off to gather more flowers. Five times during the next hour sprays of flowers were brought and added to the decorations, making the bower really look beautiful. At six o'clock the female came down from the tree where she had been feeding and went straight into the playhouse, from which to watch her lover display his plumage. The male bird now began most peculiar antics. With tail up, wings down, and neck outstretched, displaying his beautiful satin feathers, he would strut about in front of the bower, first on one side then on the other, until one would think the bird was run by clockwork. For twenty minutes it thus performed, whistling like a starling all the while. They then made a slight noise, at which the female instantly retired, but the male bird continued his antics for at least thirty seconds before he noticed that she had gone. It was now sufficiently light to try for a picture, which turned out well. As soon as the sun struck the bower he left, and did not return until 4 p.m., when the same routine was gone through again. Unfortunately, a few weeks later the bower was destroyed by a bush-fire. Two other bowers were afterwards found, but neither was so perfect as the first.

LYRE-BIRDS.—In a recent nature note in the *Argus* Mr. Donald Macdonald remarks on the high perching of the Lyre-birds at Sherbrooke Falls, Dandenong Ranges. These birds, which, before the arrival of man and the introduction of foxes, usually perched and built their nests within ten feet or so of the ground, have now learned to ascend further from danger. Mr. Macdonald recently saw an assemblage of twelve to fifteen birds roosting in a clump of high trees just below the falls, at least 100 feet above the ground. They leap or fly from bough to bough till they have reached the desired height. Before

settling down for the night they began to imitate the notes of the Laughing Jackass until there was quite a Kookaburra chorus about the camping-place.

"A CRITICAL REVISION OF THE GENUS *EUCALYPTUS*."—The forty-third part of this monograph by Mr. J. H. Maiden, I.S.O., F.R.S., F.L.S., Government Botanist of New South Wales and Director of the Botanic Gardens, Sydney, is a particularly interesting number, containing as it does descriptions and notes of three eucalypts which are well known to all lovers of that group of trees. Everyone is familiar with *E. ficifolia*, F. v. M., the Scarlet Gum of Western Australia, which has been so freely used as a park tree throughout Victoria. Being so familiar with it here, one naturally supposes it to be of frequent occurrence in the West, but that is not so; its habitat appears to be limited, being scattered over an area of about thirty-five miles by five in the vicinity of Brooke's Inlet, near Cape Leeuwin, the south-western extremity of Australia. The largest patch in one locality is about 2,000 acres. Here its character is very different to its growth in our parks. It occurs as a stunted tree, in some places forming flat-topped, impenetrable thickets 8 to 10 feet high, so intertwined that to walk over their tops would appear easier than to fight one's way through them. The species seems to be particularly subject to variation, especially in the colour of the flowers, and also to hybridization, and requires further investigation from these points of view. The next species dealt with, *E. calophylla*, R. Br., also well known in Victoria as a park tree, is generally called in the West "Red Gum," from the amount of gum—really kino—which it yields. It flowers freely, and is a good "bee tree." It has an extensive range in Western Australia, and forms a handsome tree. It normally has white flowers, but a variety, "*rosea*," has been established by nurserymen. The third species is *E. citriodora*, or, rather, *E. maculata*, Hook., var. *citriodora*, F. v. M., the Lemon-scented Gum of Queensland, originally recorded from Balmy (*sic*) Creek, about 30 miles west of Springsure, where it was collected by Major Mitchell and named by Sir W. Hooker, in the absence of flowers or fruits, on account of its fragrant smell. The tree has since been found to have an extensive range in Queensland and New South Wales, the intensity of its fragrance varying with different localities. Mr. Maiden considers it a true variety of *E. maculata*, the Spotted Gum of New South Wales and Queensland. In Victoria there seems to be considerable difference in the growth of the two trees as cultivated specimens.



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The Author of each article is responsible for the facts and opinions recorded.

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